




Washington State Transportation Framework Partnerships Across The State

Steering Committee Documents Catalog 2004

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WA-Trans Steering Committee Meeting Notes December 6, 2004

Attendees:

| Member | Association | Representing |
|----------------|--|---|
| Roland Behee | Community Transit | Transit Organizations |
| Michelle Blake | WSDOT GIS Data Administrator | WSDOT |
| Chuck Buzzard | Pierce County GIS | West side local government |
| Dave Cullom | Washington Utilities and Transportation Commission | Pipelines, Utilities, Railroad |
| Tami Griffin | WSDOT Geographic Services | WA-Trans (Project Manager), Facilitator |
| Jason Guthrie | Lincoln County | East side local government |
| Mark Hotz | WSDOT Geographic Services | WA-Trans (Assistant Project Manager) |
| Brian Jones | WSDOT Office Information Technology | WSDOT Data Modeling |
| Dave Rideout | Spokane County Engineers Office | Spokane County |
| Ian Von Essen | Spokane County GIS | E-911 |
| Pat Whittaker | WSDOT Transportation Data Office | WSDOT Transportation Data Office |
| Tim Young | Washington Department of Fish and Wildlife | Natural Resource Organizations |

Not Attending:

| Member | Association | Representing |
|--------------------|---|------------------------|
| Tareq Al-Zeer | WSDOT | WSDOT |
| Sam Bardelson | US Geological Survey Washington Liaison | The National Map |
| Dan Dickson | CRAB | CRAB |
| Jerry Harless | Puget Sound Regional Council | MPO's, RTPO's |
| Wendy Hawley | Census Bureau | US Bureau of Census |
| Tony Hartrich | Quinault Indian Nation | Quinault Indian Nation |
| Art Shaffer | WSDOT NW Region Maintenance & Ops | Alternate WSDOT |
| Elizabeth Stratton | WSDOT | Freight Interests |
| Dave Wolfer | WA Department of Natural Resources | WADNR |

- Introductions, Status Questions, Time Tracking, Action Item Review
- Next Years Meeting Schedule
- Data Model – Address Geocoding and Structure
- Standards Review and Critical Metadata Discussion
- Glossary
- ~~Front end for data users~~
- ~~Policies and Processes Feedback~~
- Action items review & closing
- Data Model Meeting

Introductions Status, Time Tracking and Review Action Items

Tim Young was introduced. Tim has been asked to represent natural resources because Dave Wolfer has been unable to attend. If Tim gets permission to continue to participate Tami will contact the DNR and let them know.

At the request of Brian and Michelle the agenda was changed to cover the “Standards Review” first and “Glossary” second and then the “Data Model”. The “Front End for Data Users” and “Policies and Processes Feedback” were not covered due to time limitation.

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Next Years Meeting Schedule

Tami has decided that enough of the work of the steering committee has been completed with the completion of the data model, standards and high-level architecture that we can start having quarterly meetings. For the time being these meetings will continue to be from 9 a.m. – 2 p.m. As we get done with the processes and policies and the steering committee's role become more of an oversight, advisory and change management role, we can make the meetings morning only. Here is the schedule for the meetings for 2005.

- January 24 in Spokane,
- April 25 in Seattle (we may have this one at Microsoft, but if not it will be in Shoreline),
- July 25 in Olympia
- October 24 in Spokane

Several steering committee members will be asked to join pilot advisory teams so they will still be quite involved.

Action Item – Tami will make sure rooms are scheduled and video-conferencing is scheduled for all meetings.

Standards Review and Critical Metadata Elements

Mark presented the standards document he has been working on. (See Appendix A for Standards) It is now based directly on the data model. The feedback on the standards in some cases will cause a change to the data model. Brian documented those instances.

The formatting required some changes. It was requested that the Entity Dictionary on page 14 be removed and the entity descriptions be put at the beginning of each entity detail table. It was also requested that the names be preserved completely so information was missing. An example was that all tables had identifier fields and without the table name concatenated you couldn't tell which was which. Brian pointed out that there was a difference between definitions and descriptions. He said that definitions shouldn't refer to data format or use words in the name. The group agreed with the words in the name portion but felt in some instances with GIS you had to refer to the data format.

Page 2 was ignored because the glossary that Mark is working on will replace it. Chuck did mention that we need to define WUTC.

Entity Table Descriptions – Page 3 - 11

Segment Point - There was significant discussion on latitude and longitude in the Segment Point entity. It was decided that they would be called easting and northing. The geometry would be put in a BLOB to be stored as x,y in State Plane South. The Horizontal Accuracy Measurement Method Identifier shows the accuracy of a segment point. If it is survey grade we need some way of storing the survey information. The decision was to pull survey description up from Segment Point Agreement up to Segment Point.

Segment Description Road – Local length is removed. Add in prefix type, prefix direction, road name, remove road number, and add in suffix direction and suffix type. Full street name is a concatenation of the whole thing. Prefix direction, prefix type, road name, name suffix, suffix type, suffix direction. Last field should be segment description identifier and is a foreign key into the segment description table.

Segment Description Table - Why are the authority fields duplicated with the Segment table? Segment table is talking about owner of the segment itself. The other is the owner of the attribution (data).

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Segment Status – Shorten the length of description.

Segment Table – It is good that it has left city, right city, but we aren't using them in the event tables. They were removed from the event table and will be put back in to the event tables that use the address using FIPS. Add to Event Surface, Event Federal Functional Class, Event Speed Limit, Event Structure, Segment Point Rail, Segment Point Ferry, Segment Point Aviation.

Federal Functional Class Event - Pat is concerned that we have federal identifier listed somewhere. When a road is federally classified it gets a number. Add federal road number to Event Federal Functional Class event table. It is totally numeric.

It appears that there is a lot of redundancy in event tables. So we will create an "event description" table and then have related tables for structures, lanes, HOV, speed, etc. Non-motorized will be handled as an event table.

Event Lanes – We need some way to identify HOV lanes and other types of lanes such as turn lanes. We may need an HOV table. Descriptors include: date began service, hours use, begin and end milepost, number of occupants required.

Event Structure – We need a description to show it is tunnels, bridges.

Segment Description Rail – We need to get definition of Track Class. Also need to update standard with WUTC naming information. Tami sent that information to Mark. It just needs to be added to the standard.

Business Rules – Page 15

The numbering needs to be consistent between the earlier business rules and the ones for QA/QC. They should all be handled the same way.

We removed rules 2, 5, 6, 13, 15, 16, 17, 20, 21.

The following rules have specific feedback as described:

9) OK – Clarify in documentation.

11) Feature level (who provides it – the provider) WA-Trans date, handled through the database in WA-Trans.

12) Remove the word "address"

14) Multi-modal segments will be accommodated with multiple features having coincident geography ("stacked arcs") for a mix of modes (railroad, road) and event tables for all road type modes (bus, motorized, non-motorized). If the facility can't be shared with other types of vehicles (rail) then it is stacked arcs, otherwise it is handled with event tables (bike lane on road).

18) Populate empty fields with null (translator feature, the translator will ask what is the format for an "empty" fields from a data provider)

22) Domain and metadata

23) Do we want to concatenate? We don't have a unique statewide system for this. This relates to linear referencing. There is a proposal to concatenate state FIPS and County FIPS along with County Route number and the provider. Michelle will develop a proposal and send out for review.

4.2 - 1) OK – more detailed definition

4.2 -2) Line features contiguous (agreement points, etc)

4.2 - 3) Every feature should have one attribute record for everything but the segment description road table

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- 4.2 – 4) The long-term goal is for each later of submitted data to have complete attributes ...
- 4.2 - 5) Frequency updates will be established (data sharing agreement) (removed)
- 4.2 - 6) Reword or remove (data sharing agreements and data submission policies)
- 4.2 -7) Removed “to be signed off on”

Action Item – Mark will change the standards to reflect what was decided.

Action Item - Brian will change the data model where appropriate.

Critical Metadata

Parts of the translator requirements include eliciting metadata from the data provider when inadequate metadata is provided. The group was asked to identify “critical” metadata from the standard that the translator will ask the provider to input if they don’t provide adequate metadata. The numbering is based upon the numbering used in the ISB/WAGIC – Basic Metadata Subset and the Working Subset Metadata Standard. Critical metadata include:

ISB/WAGIC Basic Metadata Standard

- Title (1)
- Publisher (2)
- Time Period of Content (3) Beginning Date & Ending Date
- Place Keyword (9)
- Data Quality (10), (11) Source Information, Source Period of Content
- Entity and Attribute (14) (15) Overview Description, Entity/Attribute
- Point of Contact (16), (17), (18), (19), (20), (21), (22), (23), (24), (25), (26), (27)

Working Subset

- Progress (1.4.1)
- Maintenance and Update Frequency (1.4.2)
- Direct Spatial Reference Method (3.2) (Only point and vector data)
- Grid Coordinate System (4.1.2.2)
- SPCS Zone Identifier (4.1.2.2.4) (Must use FIPS Zone Identifier)
- Planar Coordinate Information (4.1.2.4)
- Horizontal Datum Name (4.1.4.1)
- **Translator will translate between:**
- **Coordinate Systems must include: Geographic, WA State Plane South, WA State Plane North, UTM Zone 10 or UTM Zone 11**
- **Horizontal Datum Name: NAD 27, NAD 83, HARN**
- **Units must be: US Survey Feet or Meters or decimal degrees**
- Entity Type Label (5.1.1.1)
- Entity Type Definition (5.1.1.2)
- Attribute Label (5.1.2.1)
- Attribute Definition (5.1.2.2)

Action Item – Tami will make sure this information is shared with Gary at Bfirst Solutions, Inc.

Review Glossary

There wasn’t enough time to go through the Glossary. (See Appendix B for Glossary) However, feedback was requested. A notice will be sent out and feedback must be sent promptly as this goes into the standards and they must go to Gary at Bfirst Solutions, Inc. as soon as possible.

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Action Item – Tami will send out notice of feedback for the glossary.

Action Item – Mark will update glossary based on feedback and put in the standards document.

Data Model Review

Several issues with the data model needed to be dealt with.

Address Geocoding

At the last meeting Chuck Buzzard brought up some concerns with the way the model was handling various modes along with roads, particularly railroad data and bike paths which would further segment the roadway and make address geocoding not work correctly. He wrote a white paper, which explained his concerns. (See Appendix C for paper) This paper was shared with Dave and Ian at Spokane County, and they agreed with Chuck's conclusions. Then it was shared with the rest of the data-modeling group. Tami asked Michelle to propose some alternative solutions. (*This paper is too large to e-mail but will be available on the WA-Trans website with the meeting notes*).

Information on the various options follows along with dialog regarding them.

Option 1 – Create point event tables to locate at-grade, non-road crossings with roadways.

Option 2 – Use second order points to identify at-grade, non-road crossings with roadways. Uses separate special points to handle this. Point attributes might include: type, and other information. The second order point would be an event. Must have some way to make sure you have the link. Private roads may not have a linear referencing system to work with. Need a business rule that says you will always have road and rails with separate geometry. (Segment Mode table can never have a rail and road combined together). Another rule is second order points do not break segments.

Option 3 – User a path Table to aggregate roadway segments. The aggregated roadway segments then would be described for geocoding uses. *Would require an additional translator function that would join segments together for the purposes of geocoding.*

Option 4 – Include geocoding separate from the segments uses for connectivity.

Option 5 – Separate all modes out into their own database – or into their own sets of related tables within the same database. Could mimic this through views. Would require a field in the segment table to handle this.

Tim like this because it is more similar to what vendors already have. It was recognized that PSRC would very likely least like this alternative, but Jerry did not provide feedback on this document.

The group selected option 2.

Brian's Questions

Brian had several questions, which are attached as Appendix D, and he stated these were answered during the normal discussion previously.

1. The versioning is handled
2. Discussed with attribution.

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3. Handled through unique segment ID's

Options for Storing Event Data in WA-Trans

Some concerns about use of event data based on route/milepost (point) were raised in e-mail dialogs regarding the data model. Michelle developed a document laying out options for maintaining synchronization between events and segments. The document is Appendix E. The following lists the options along with discussion:

1. Use traditional ESRI methods of using route/milepost or address information to place tabular information as either lines or points along a data set constructed to show the relative locations of such items along an established linear referencing system.

Most of us are using this option. Most data will come from an ESRI model. Dave R. has some concerns because of measurement errors and gaps showing. When you are working with a linear referencing system the closest you can get is 5 feet and so you have difficulty. We have to accept the inherent error that we could get. Pierce County has created reference points for each segment and then maintains data on the arc. Then they generate the LRS on the arc. Road log number and from and to milepost is stored on the arc.

Metadata needs to clarify that event data based on linear referencing will have some gaps. This is of concern for networking based activity. Dave can live with this as long as we clearly state the limitations for users.

2. Store event information as a percentage along a segment.
3. Store all data currently stored in event tables as attribute data for each .001 of a mile of a given feature.

Dave R. supports this idea.

It was agreed that we would use option 1 and make sure metadata clarified the limitations.

More Data Model Questions

Brian is concerned with what can be deleted when a foreign key field is deleted.

- It was agreed that we wouldn't delete any children records of authority. Brian will add an active flag to authority.
- It was also agreed that we need a process for retiring a segment and copying the segment descriptions and updating them.

Action Item – Brian will make changes to the data model based on discussions at this meeting and provide results Friday December 10 if possible.

The group was getting too tired to think clearly. Since the deletion and retiring process having nothing to do with the translator is was agreed to table this discussion. Brian will work on the data model with the changes, send it out and then we can make the other decisions.

Action items review & closing

WA-Trans Steering Committee Meeting Notes

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The next WA-Trans partner meeting is January 24 from 9 a.m. to noon with video-conferencing upon request at the WSDOT Eastern Region Headquarters Office Pend Orielle room in Spokane . All steering committee members are strongly encouraged to attend.

**WA-Trans Steering Committee Meeting Notes
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Appendix A – WA-Trans Standard

WA-Trans Data Standards

WA-Trans Data Standards – Draft



1.0 Introduction

The Washington Statewide Transportation Framework Project (WA-Trans) was organized to create an electronic map and spatial data set of transportation data for use in Geographic Information Systems (GIS) across the state. The WA-Trans partners have delegated the development of the Transportation Framework Data Standards to the WA-Trans steering committee. These standards are comprised of road, rail, transit, ferries, air, and non-mechanized transportations modes. The data standards will be used as a guideline for data collection during two pilot projects in the Puget Sound and along the Oregon-Washington border. These standards will be adjusted as necessary as experience is steadily being acquired during these pilot projects.

1.1 Mission and Goals of the Data Standards

The WA-Trans Data Standard will enhance the will and ability of partners to collect and maintain the data, and to allow data quality to improve over time for long-term data maintenance and updates. This process will also help participants recognize the capabilities of existing technology and upgrade their technology as it advances.

1.2 Intended use description

The purpose of the WA-Trans Data Standards is to create a set of common requirements for the collection and exchange of information from a variety of spatial and tabular data sources (GIS, CAD, etc.) This information will create a statewide set of data layers developed as a comprehensive transportation network.

WA-Trans Data Standards

Scope – Basic Overview of data types, mechanisms

The scope of the WA-Trans Data Standards identifies the modes of transportation data to be collected. It also includes the geographic extent, scale, datum, metadata, linear referencing, feature attributes, and data quality. Other relevant information can be found in the WA-Trans Data Model, Architecture and Processes documentation.

2.1 Definitions

Points - A point is a single object with a specific geographic location. Point data can be based on dynamic segmentation of roadways (using mileposts or distance from intersection), x, y coordinates from GPS, or geocoded addressing information. It is typically a zero-dimensional abstraction of an object that usually represents a geographic feature too small to be displayed as a line or area at that scale.

Lines - A line is a linear feature used to define a shape or represent a contour, or a real or imaginary mark positioned in relation to fixed points of reference. Line data can be based on linear dynamic segmentation of roadways.

Event - A geographic location stored in tabular rather than spatial form that can be related directly to a spatially congruent entity (usually a linear entity). Event types include address events, route events (that depict occurrences along a linear entity), x y events, and temporal events, all of which can be viewed in a GIS as if it were a part of the spatial data.

Polygon - A polygon is a closed, two-dimensional figure with at least three sides that represents an area. It is used in GIS to describe spatial elements with a discrete area, such as parcels, political districts, areas of homogeneous land use, and soil types. Polygon data layers will be used as a reference for clipping other data layers.

2.2 Symbols and Abbreviations

| Abbreviation | Description |
|--------------|---|
| LLRS | Linear Location Reference System |
| LRS | Linear Reference System |
| NAD | North American Datum |
| ISB | Information Services Board |
| FGDC | Federal Geographic Data Committee |
| NSDI | National Spatial Data Infrastructure |
| CAD | Computer Aided Drafting |
| GIS | Geographic Information Systems |
| WSDoT | Washington State Department of Transportation |
| WA-TRANS | Washington Transportation Framework for GIS |

WA-Trans Data Standards

3.0 Data Characteristics

The following data characteristics outline included attribution for all transportation modes and attribution for specific transportation modes. These requirements are subject to change based on findings during the two pilot projects.

3.1 Potentially required Attribution

3.1.1 Points (Roads)

| Segment Point | Unique Identifier | INTEGER | Main database link that relates this table to Segment Point type, Segment Point Rail, Segment Point Ferry, Segment Point Airport, Segment Status, Segment Description and Authority tables |
|-------------------------|---|---------------|--|
| | Agreement Indicator | NCHAR(1) | Designates an agreement for location between jurisdictions |
| | Object Code | NCHAR(1) | Object code indicating that a particular piece of data is a point. (FW-part of Trans. Point ID). |
| | Local Identifier | CHAR(9) | Identifier assigned to Road Segment Point by Road Data Contributor (if applicable). |
| | Location Description | CHAR(255) | An unambiguous description of the road segment point, which makes it field recoverable. (FW-Location Description). |
| | Latitude | DECIMAL(10,6) | The angular distance measured on a meridian north or south from the equator of the road segment point (NAD83). (FW-Latitude). |
| | Longitude | DECIMAL(10,6) | The angular distance between the plane of a meridian east or west from the plane of the prime meridian of the roads segment point (NAD83). (FW-Longitude). |
| | Create Date | DATE | Date assigned to Road Segment Point that indicates the date that road segment point data was created. |
| | Update Date | DATE | Date assigned to Road Segment Point that indicates the date that road segment point data was updated. |
| | Validate Date | DATE | Date assigned to Road Segment Point that indicates the date that road segment point data was validated (verified). |
| | Retire Date | DATE | Date assigned to Road Segment Point that indicates the date that road segment point data was retired. |
| | Order Indicator | CHAR(5) | Defines the nature of the point of record: 1st order - a point where a segment is broken; e.g. begin/end 2nd order - point not at the break of a segment, but where there is facility information, specifically intersection (at grade) with another road. Perhaps we can define additional 'orders' for road/rail at-grade intersections, etc. |
| | FIPS State Identifier | CHAR(2) | To be defined |
| | FIPS County Identifier | CHAR(3) | To be defined |
| | FIPS Left City Identifier | CHAR(5) | To be defined |
| | FIPS Right City Identifier | CHAR(5) | To be defined |
| | Agreement Identifier | INTEGER | To be defined |
| | Segment Point Type Identifier | INTEGER | To be defined |
| | Authority Contributor Identifier | INTEGER | To be defined |
| | Authority Data Maintainer Identifier | INTEGER | To be defined |
| | Status Identifier | INTEGER | To be defined |
| | Horizontal Accuracy Measurement Method Identifier | INTEGER | Contains data pertaining to horizontal accuracy and measurement method of a road segment point |
| Segment Point Agreement | Agreement Identifier | INTEGER | To be defined |
| | Document Description | CHAR(255) | To be defined |
| | Survey Description | CHAR(255) | To be defined |

WA-Trans Data Standards

3.1.2 Segment Data (Roads)

| Segment Description Road | Road Identifier | INTEGER | Main database link that relates this table to other tables |
|--------------------------|--------------------|--------------|---|
| | Local Length | DECIMAL(9,2) | A measured length of a segment described by the Length (US Survey Ft) Accuracy Measurement Method Code (FW-Length, T-FIT-Length). |
| | Left Low Address | CHAR(10) | Describes the left low address of a road segment as it relates to the Road segment description, assigned by the Road Data Contributor. |
| | Left High Address | CHAR(10) | To be defined |
| | Left Zip Code | CHAR(10) | To be defined |
| | Right Low Address | CHAR(10) | Describes the right low address of a road segment as it relates to the Road segment description, assigned by the Road Data Contributor. |
| | Right High Address | CHAR(10) | To be defined |
| | Right Zip Code | CHAR(10) | To be defined |
| | Name Prefix | CHAR(15) | To be defined |
| | Road Name | CHAR(50) | To be defined |
| | Road Number | CHAR(20) | To be defined |
| | Name Suffix | CHAR(15) | To be defined |
| | Name Type | CHAR(15) | To be defined |
| | Full Street Name | CHAR(125) | To be defined |
| | Identifier | INTEGER | To be defined |

| Segment Description | Segment Identifier | INTEGER | Unique identifier assigned to Road Segment that relates the surface type to the road segment. |
|---------------------|--|--------------|--|
| | Local Identifier | CHAR(9) | Identifier assigned to Road Segment Description by Road Data Contributor (if applicable). |
| | Local LRS Description | CHAR(25) | Local Linear Referencing System method and value |
| | Alternate Name Flag | BOOLEAN | Indicates if the Description record is an alternate, 'common' name as opposed to an official name given by the owner of the segment. |
| | Path Description | CHAR(255) | Description assigned to road segment by Road Authority that describes circumstances regarding road segment. |
| | Create Date | DATE | Date assigned to Road Segment Description that indicates the date that road segment data was created. |
| | Update Date | DATE | Date assigned to Road Segment Description that indicates the date that road segment data was updated. |
| | Validate Date | DATE | Date assigned to Road Segment Description that indicates the date that road segment data was validated (verified). |
| | Retire Date | DATE | Date assigned to Road Segment Description that indicates the date that road segment data was retired. |
| | Local Length | DECIMAL(9,2) | A measured length of a segment described by the Length Accuracy Measurement Method Code (FW-Length, T-FIT-Length). |
| | Begin Milepoint | DECIMAL(6,3) | Milepoint describing the beginning of a road segment as it relates to the Road segment description, assigned by the Road Data Contributor. |
| | End Milepoint | DECIMAL(6,3) | Milepoint describing the ending of a road segment as it relates to the Road segment description, assigned by the Road Data Contributor. |
| | Length Accuracy Measurement Method Identifier | INTEGER | To be defined |
| | To Segment Point | INTEGER | To be defined |
| | From Segment Point | INTEGER | To be defined |
| | Authority Segment Description Contributor Identifier | INTEGER | To be defined |
| | Authority Segment Description Data Maintainer Identifier | INTEGER | To be defined |
| | Segment Status Identifier | INTEGER | To be defined |

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| Segment Status | Status Identifier | INTEGER | Unique identifier that relates to Segment Point, Segment Description and Segment tables |
|----------------|-------------------|-----------|---|
| | Code | CHAR(1) | Represents the nature of the road segment for use for the network O-operational R-retired P-proposed C-closed |
| | Description | CHAR(100) | Description of the Single character Status Code. O-operational R-retired P-proposed C-closed |

| Authority | Authority Identifier | INTEGER | Unique identifier that relates to all Event, Segment, Segment Description and Segment Point tables |
|-----------|----------------------|-----------|---|
| | Short Name | CHAR(6) | The standard acronym used for the organization. Example: WSDOT is the short name for Washington State Department of Transportation. |
| | Name | CHAR(60) | To be defined |
| | Description | CHAR(300) | To be defined |
| | Create Date | DATE | To be defined |

| Segment | Segment Identifier | INTEGER | Unique identifier assigned to Road Segment that relates the surface type to the road segment. |
|---------|---|--------------|--|
| | Local Identifier | CHAR(9) | Identifier assigned to Road Segment by Road Data Contributor. |
| | Create Date | DATE | Date assigned to Road Segment that indicates the date that road segment data was created by contributor. |
| | Update Date | DATE | Date assigned to Road Segment that indicates the date that road segment data was updated. |
| | Validate Date | DATE | Date assigned to Road Segment that indicates the date that road segment data was validated (verified). |
| | Retire Date | DATE | Date assigned to Road Segment that indicates the date that road segment data was retired. |
| | Object Code | CHAR(1) | Object code indicating that a particular piece of data is a segment. (FW-part of Trans. Segment ID). |
| | Length | DECIMAL(9,2) | Road segment length number calculated at the WA-Trans database level. |
| | Geometry | LARGE BINARY | Road segment geometry cataloged by WA-Trans software, stored in a Binary Large Object (BLOB) format that describes the road segment. |
| | Horizontal Accuracy Measurement Method Identifier | INTEGER | Contains data pertaining to horizontal accuracy and measurement method of a road segment point |
| | FIPS State Identifier | CHAR() | To be defined |
| | FIPS County Identifier | CHAR() | To be defined |
| | FIPS Left City Identifier | CHAR() | To be defined |
| | FIPS Right City Identifier | CHAR() | To be defined |
| | Authority Owner Identifier | INTEGER | To be defined |
| | Authority Infrastructure Maintainer Identifier | INTEGER | To be defined |
| | Authority Data Maintainer Identifier | INTEGER | To be defined |
| | Authority Contributor Identifier | INTEGER | To be defined |
| | Status Identifier | INTEGER | To be defined |

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| | | | |
|---------------------|----------------------|---------|---|
| Segment Mode | Segment Identifier | INTEGER | Unique identifier assigned to Road Segment that relates the surface type to the road segment. |
| | Mode Type Identifier | INTEGER | Unique identifier that links to Mode Type table |

| | | | |
|------------------|-------------|-----------|---|
| Mode Type | Identifier | INTEGER | Unique identifier that relates to Segment Mode and Segment tables |
| | Code | CHAR() | To be defined |
| | Description | CHAR(100) | To be defined |

| | | | |
|---------------------|-------------|-----------|---|
| Surface Type | Identifier | INTEGER | Unique identifier that relates to Segment Point Airport and Event Surface Identifier tables |
| | Code | CHAR(1) | To be defined |
| | Description | CHAR(100) | To be defined |

| | | | |
|-----------------------|-------------|-----------|---|
| Structure Type | Identifier | INTEGER | Unique identifier that relates to Event Structure table |
| | Description | CHAR(100) | To be defined |

| | | | |
|---------------------------|-------------|-----------|---|
| Segment Point Type | Identifier | INTEGER | Unique identifier that relates to Segment Point table |
| | Code | CHAR() | To be defined |
| | Description | CHAR(100) | To be defined |

3.1.3 Event Data

| | | | |
|---------------------------------------|----------------------------|--------------|--|
| Event Federal Functional Class | Identifier | INTEGER | Unique identifier that relates to Authority table |
| | Code | CHAR(1) | To be defined |
| | LRS Description | CHAR(25) | To be defined |
| | Begin Milepoint | DECIMAL(6,3) | To be defined |
| | End Milepoint | DECIMAL(6,3) | To be defined |
| | Begin Address | CHAR(10) | Begin address number that is coincident with the beginning position of the specific event; e.g. 809 |
| | Begin Full Street Name | CHAR(125) | Begin full street name that is coincident with the beginning position of the specific event; e.g. Capital Blvd. SW |
| | Begin Zip Code | CHAR(10) | Begin zip code that is coincident with the beginning position of the specific event; e.g. 98501 |
| | End Address | CHAR(10) | End address number that is coincident with the beginning position of the specific event; e.g. 1009 |
| | Full Street Name | CHAR(125) | End full street name that is coincident with the beginning position of the specific event; e.g. Capital Blvd. SW |
| | End Zip Code | CHAR(10) | End zip code that is coincident with the beginning position of the specific event; e.g. 98504 |
| | Create Date | DATE | The creation date of the data pertaining to the specified event. |
| | Validate Date | DATE | To be defined |
| | Retire Date | DATE | To be defined |
| | Update Date | DATE | The date the data pertaining to the specified event was last updated. |
| | Contributor Identifier | INTEGER | To be defined |
| | Data Maintainer Identifier | INTEGER | To be defined |

WA-Trans Data Standards

| Event Lanes | Identifier | INTEGER | Unique identifier that relates to Authority table |
|-------------|--|--------------|--|
| | Code | CHAR(1) | To be defined |
| | Count | INTEGER | The numbers of lanes in the segment section from the specified start milepoint to the end milepoint. |
| | Local LRS Description | CHAR(25) | To be defined |
| | Begin Milepoint | DECIMAL(6,3) | To be defined |
| | End Milepoint | DECIMAL(6,3) | To be defined |
| | Begin Address | CHAR(10) | Begin address number that is coincident with the beginning position of the specific event; e.g. 809 |
| | Begin Full Street Name | CHAR(125) | Begin full street name that is coincident with the beginning position of the specific event; e.g. Capital Blvd. SW |
| | Begin Zip Code | CHAR(10) | Begin zip code that is coincident with the beginning position of the specific event; e.g. 98501 |
| | End Address | CHAR(10) | End address number that is coincident with the beginning position of the specific event; e.g. 1009 |
| | End Full Street Name | CHAR(125) | End full street name that is coincident with the beginning position of the specific event; e.g. Capital Blvd. SW |
| | End Zip Code | CHAR(10) | End zip code that is coincident with the beginning position of the specific event; e.g. 98504 |
| | Create Date | DATE | The creation date of the data pertaining to the specified event. |
| | Update Date | DATE | The date the data pertaining to the specified event was last updated. |
| | Validate Date | DATE | To be defined |
| | Retire Date | DATE | To be defined |
| | Authority Event Lanes Contributor Identifier | INTEGER | To be defined |
| | Authority Event Lanes Data Maintainer Identifier | INTEGER | To be defined |

WA-Trans Data Standards

| Event Speed Limit | Identifier | INTEGER | Unique identifier that relates to Authority table |
|-------------------|----------------------------|--------------|--|
| | Maximum Legal Speed | INTEGER | The legally defined maximum velocities for the section of segment between the specified begin milepoint and end milepoint. Example: 55 |
| | Maximum Legal Speed Unit | CHAR() | Defines the unit of measurement used for the speed limit. MPH - Miles per hour KPH - Kilometers per hour |
| | Local LRS Description | CHAR(25) | To be defined |
| | Begin Milepoint | DECIMAL(6,3) | To be defined |
| | End Milepoint | DECIMAL(6,3) | To be defined |
| | Begin Address | CHAR(10) | Begin address number that is coincident with the beginning position of the specific event (speed limit); e.g. 809 |
| | Begin Full Street Name | CHAR(125) | Begin full street name that is coincident with the beginning position of the specific event; e.g. Capital Blvd. SW |
| | Begin Zip Code | CHAR(10) | Begin zip code that is coincident with the beginning position of the specific event; e.g. 98501 |
| | End Address | CHAR(10) | End address number that is coincident with the beginning position of the specific event; e.g. 1009 |
| | End Full Street Name | CHAR(125) | End full street name that is coincident with the beginning position of the specific event; e.g. Capital Blvd. SW |
| | End Zip Code | CHAR(10) | End zip code that is coincident with the beginning position of the specific event; e.g. 98504 |
| | Create Date | DATE | The creation date of the data pertaining to the specified event. |
| | Update Date | DATE | The date the data pertaining to the specified event was last updated. |
| | Validate Date | DATE | To be defined |
| | Retire Date | DATE | To be defined |
| | Contributor Identifier | INTEGER | To be defined |
| | Data Maintainer Identifier | INTEGER | To be defined |

WA-Trans Data Standards

| Event Structure | Identifier | INTEGER | Unique identifier that relates to Structure Type and Authority tables |
|-----------------|--|--------------|--|
| | Local Code | CHAR(25) | This is the data contributor's local identifier of the particular structure from the begin point to the end point. |
| | Local Name | CHAR(100) | The commonly used reference of the structure under consideration. |
| | Local LRS Description | CHAR(25) | To be defined |
| | Begin Milepoint | DECIMAL(6,3) | To be defined |
| | End Milepoint | DECIMAL(6,3) | To be defined |
| | Begin Address | CHAR(10) | Begin address number that is coincident with the beginning position of the specific event; e.g. 809 |
| | Begin Full Street Name | CHAR(125) | Begin full street name that is coincident with the beginning position of the specific event; e.g. Capital Blvd. SW |
| | Begin Zip Code | CHAR(10) | Begin zip code that is coincident with the beginning position of the specific event; e.g. 98501 |
| | End Address | CHAR(10) | End address number that is coincident with the beginning position of the specific event; e.g. 1009 |
| | End Full Street Name | CHAR(125) | End full street name that is coincident with the beginning position of the specific event; e.g. Capital Blvd. SW |
| | End Zip Code | CHAR(10) | End zip code that is coincident with the beginning position of the specific event; e.g. 98504 |
| | Create Date | DATE | The creation date of the data pertaining to the specified event. |
| | Validate Date | DATE | To be defined |
| | Update Date | DATE | The date the data pertaining to the specified event was last updated. |
| | Retire Date | DATE | To be defined |
| | Type Identifier | INTEGER | To be defined |
| | Authority Event Structure Owner Identifier | INTEGER | To be defined |
| | Authority Event Structure Contributor Identifier | INTEGER | To be defined |
| | Authority Event Structure Data Maintainer Identifier | INTEGER | To be defined |

What about point structures?

WA-Trans Data Standards

| Event Surface | Identifier | INTEGER | Unique identifier that relates to Surface Type and Authority tables |
|---------------|--|--------------|--|
| | Local LRS Description | CHAR(25) | To be defined |
| | Begin Milepoint | DECIMAL(6,3) | Milepoint number that is coincident with the beginning position of a particular surface type. |
| | End Milepoint | DECIMAL(6,3) | Milepoint number that is coincident with the ending position of a particular surface type. |
| | Begin Address | CHAR(10) | Begin address number that is coincident with the beginning position of the specific event; e.g. 809 |
| | Begin Full Street Name | CHAR(125) | Begin full street name that is coincident with the beginning position of the specific event; e.g. Capital Blvd. SW |
| | Begin Zip Code | CHAR(10) | Begin zip code that is coincident with the beginning position of the specific event; e.g. 98501 |
| | End Address | CHAR(10) | End address number that is coincident with the beginning position of the specific event; e.g. 1009 |
| | End Full Street Name | CHAR(125) | End full street name that is coincident with the beginning position of the specific event; e.g. Capital Blvd. SW |
| | End Zip Code | CHAR(10) | End zip code that is coincident with the beginning position of the specific event; e.g. 98504 |
| | Create Date | DATE | The creation date of the data pertaining to the specified event. |
| | Update Date | DATE | The date the data pertaining to the specified event was last updated. |
| | Validate Date | DATE | To be defined |
| | Retire Date | DATE | To be defined |
| | Authority Event Surface Contributor Identifier | INTEGER | To be defined |
| | Authority Event Surface Data Maintainer Identifier | INTEGER | To be defined |
| | Surface Type Identifier | INTEGER | To be defined |

| Horizontal Accuracy Measurement Method | Horizontal Accuracy Measurement Method Identifier | INTEGER | Unique identifier that relates to Segment table |
|--|---|---------|---|
|--|---|---------|---|

3.1.4 Other Transportation Modes (Pending)

3.1.5 Non-motorized

| Field Name | Type | Width | Description |
|--------------|--------|-------|---|
| MODEFLAG | String | 1 N | Code depicting mode type |
| WIDTH | Number | 3 ? | Of segment (road) |
| PAVEMENTTYPE | String | 1 | Pavement type assigned by RDOWNER/SUBMITTER? |
| OWNER | String | 50 | Entity responsible for maintenance of segment |

WA-Trans Data Standards

3.1.6 Railroad

| Segment Point Rail | Identifier | INTEGER | Unique identifier that relates to the Segment Point table |
|--------------------|-----------------------------|-----------|---|
| | Station Name | CHAR(100) | To be defined |
| | Point Identifier | INTEGER | To be defined |
| | Address | CHAR(10) | To be defined |
| | Full Street Name | CHAR(125) | To be defined |
| | Segment Point Rail Zip Code | CHAR(10) | To be defined |

| Segment Description Rail | Identifier | INTEGER | Surrogate key generated by database upon insertion of a record. |
|--------------------------|--------------------------------|----------|---|
| | Name | CHAR() | The name of the "line" or railroad company |
| | Operator | CHAR() | Could be the owner, but may not be. |
| | WUTC Line Identifier | CHAR() | To be decided by WSDOT and WUTC. Simplest method that makes sense. |
| | Rail From Station | CHAR(20) | To be defined |
| | Rail To Station | CHAR(20) | To be defined |
| | USDOT Number | CHAR() | A code for all railroad crossings. |
| | Crossing Code | CHAR() | Type of crossing - over, under, at grade, pedestrian |
| | Public Flag | BOOLEAN | Indicates if Railroad feature part of public railroad line? 1 = Yes 0 = No |
| | Track Class | INTEGER | Federal designator that indicates various things such as maximum speed allowed. Can be values 0 - 6 |
| | Passenger Train Flag | BOOLEAN | Identifies if a regularly scheduled passenger train uses the line. |
| | Track Count | INTEGER | The number of tracks within the rail segment. Applies both to rail lines and crossings. |
| | Warning Device | INTEGER | Code identifying whether there is sign, or lights or other types of devices. From the Federal Railway Administration Data |
| | Segment Description Rail Type | CHAR() | Describes the nature of rail segment. This could be part of the mode code. Possible values include: siding, mainline, industrial spur |
| | Segment Description Identifier | INTEGER | To be defined |

WA-Trans Data Standards

3.1.7 Aviation

| | | | |
|------------------------------------|------------|---------|---------------------|
| Segment Description Airport | Identifier | INTEGER | Currently unrelated |
|------------------------------------|------------|---------|---------------------|

| | | | |
|------------------------------|--|--------------|---|
| Segment Point Airport | Identifier | INTEGER | Unique identifier that relates to Segment Point and Surface Type tables |
| | Point Identifier | INTEGER | To be defined |
| | Airport Identifier | CHAR(4) | To be defined |
| | Instrument Approach | BOOLEAN | To be defined |
| | ARC Code | CHAR(4) | Size, weight, speed and length of wings from tip to tip; (can be used to determine maximum size of aviation vehicle that can utilize airport.) |
| | Surface Width | DECIMAL(4) | To be defined |
| | Elevation | DECIMAL(6,1) | The vertical distance above or below a reference ellipsoid. For WSDOT this reference ellipsoid is designated WGS84. |
| | Elevation Unit | CHAR(10) | The system of measurement used for the Elevation of the airfield; e.g. feet or meters. |
| | FAA Classification | CHAR(30) | Federal Aviation Administration Classification. One of the five basic airport service levels which describe the type of service that the airport is expected to provide to the community at the end of the 5-year planning period. The service levels also represent funding categories for the distribution of Federal aid. PR Commercial Service - Primary CM Commercial Service – Non-primary CR Commercial Service Airport that also serves as a reliever (included with CM in statistical summaries) RL Reliever Airport GA General Aviation Airport |
| | State Classification | CHAR(10) | To be defined |
| | Airport Name | CHAR(100) | To be defined |
| | Control Flag | BOOLEAN | Indicates if an Airport is controlled (i.e. has a tower) or not. 1 = Controlled (yes) 0 = Uncontrolled (no) |
| | AWAS Flag | BOOLEAN | Automated Weather Advisory System. Bit flag indicating if the airport on record has this system or not. 1 = Yes 0 = No |
| | Owner | CHAR(30) | To be defined |
| | Terminal Flag | BOOLEAN | Bit flag, which indicates whether or not the airport on record has a terminal. 1 = Yes 0 = No |
| | Airport Use | CHAR() | PU = Public use. A public use airport is an airport available for use by the general public without a requirement for prior approval of the owner or operator. The owners of public use airports cannot impose operational restrictions on the use of the airport. Restrictions such as prior permission required or use at your own risk or contact the airport manager prior to landing are not permissible at public use airports. PR = Private use. A private use airport is an airport available for use by the owner only or by the owner and other persons authorized by the owner only. The owners of private use airports do not have to reiterate in a remark in data element 110 that the airport is private use or that prior permission is required. |
| | Segment Point Airport Address | CHAR(10) | To be defined |
| | Segment Point Airport Full Street Name | CHAR(125) | To be defined |
| | Segment Point Airport Zip Code | CHAR(10) | To be defined |

WA-Trans Data Standards

3.1.8 Ferries

| Segment Point Ferry | Identifier | INTEGER | Unique Identifier that relates to Segment Point table |
|---------------------|--------------------------|-----------|---|
| | Name | CHAR(50) | Terminal Name |
| | Address | CHAR(10) | Terminal Address |
| | Full Street Name | CHAR(125) | To be defined |
| | Ferry Zip Code | CHAR(10) | To be defined |
| | Segment Point Identifier | INTEGER | To be defined |

| Segment Description Ferry | Identifier | INTEGER | Unique identifier that relates to Segment Description table |
|---------------------------|--------------------------------|--------------|---|
| | Hours Not Available | CHAR(30) | To be defined |
| | System-Wide Restrictions | CHAR(30) | To be defined |
| | Route Load Restrictions | CHAR(30) | To be defined |
| | Route Length Restrictions | CHAR(30) | To be defined |
| | Route Crossing Time | DECIMAL(3,0) | To be defined |
| | Segment Description Identifier | INTEGER | To be defined |

WA-Trans Data Standards

3.2 Entity Dictionary

| Entity Name | Entity Definition |
|--|--|
| Authority | <p>Any organization that takes responsibility for proposing, designating or working in partnerships with other organization to define FTRP and FTSeg. Also may be expanded to include any organization that interacts with the WA-Trans System in any one of several ways.</p> <p><u>Owner</u> - An organization that owns the physical infrastructure recorded within the WA-Trans System.</p> <p><u>Infrastructure Maintainer</u> - An organization that maintains any part of the physical infrastructure for which data is recorded in the WA-Trans System. This entity may be different than the owner. An example is a State Route that passes through a city and an agreement between WSDOT and the city stipulates that the city is responsible for maintaining that portion of the State Route. In this case, WSDOT is the owner, but the city is the Infrastructure Maintainer.</p> <p><u>Data Maintainer</u> - An organization that maintains data within the WA-Trans System (could also be user).</p> <p><u>Contributor</u> - An organization that contributes data to the WA-Trans System. May be an organization other than the owner, or physical maintainer. (the best available source) [could also be user and maintainer]</p> <p><u>User</u> - An organization who does not participate in the defining of FTRP and FTSeg and does not contribute data to WA-Trans but who may wish to use the data.</p> |
| Event Federal Functional Class | Contains data pertaining to the Federal functional class of the portion of the transportation mode from the specified start point to the specified end point. |
| Event Lanes | Contains data pertaining to lanes of the portion of the transportation mode from the specified begin point to the specified end point. |
| Event Speed Limit | Contains data pertaining to the speed limit of the portion of the transportation mode from the specified begin point to the specified end point. |
| Event Structure | Contains data pertaining to the structure(s) inhabiting the portion of the transportation mode from the specified begin point to the specified end point. Examples may be a bridge, tunnel, etc. |
| Event Surface | Contains data pertaining to surface type of the portion of the transportation mode from the specified begin point to the specified end point. |
| Horizontal Accuracy Measurement Method | Contains data pertaining to horizontal accuracy and measurement method of a road segment point |
| Length Accuracy Measurement Method | Contains data pertaining to length accuracy and measurement method of a road segment point |
| Mode Type | Mode type describes the nature of the segment in question. Examples include Automobile lane, bike lane, rail line, ferry route, etc. - Domain: |
| Segment | <p>A specified directed path between two Framework Transportation Segment Reference Points along a physical transportation system that identifies a unique segment of that physical system.</p> <p>The NSDI Framework Transportation Identification Standards states that Segments must not span State or international borders.</p> |
| Segment Description | Descriptive data pertaining to segments regardless of mode type. Specific descriptive data for each mode is handled in separate mode description tables. |
| Segment Description Airport | |
| Segment Description Ferry | Contains data pertaining to Ferry features of the transportation mode at the specified terminal |
| Segment Description Rail | Special condition of a segment description? |
| Segment Description Road | Descriptive data pertaining to road segments. |
| Segment Point | <p>The specified location of the (required) points [From/To] of a Framework Transportation Segment (FTSet), or an (optional) reference point offset along the length of the FTSeg, on a physical transportation system.</p> <p>The specified location of an endpoint of a Framework Transportation Segment (FTSeg), or a reference point offset along the length of the FTSeg, on a physical transportation system.</p> <p>A zero dimensional object that specifies geometric location. A pair (e.g., "x,y") or triplet (e.g., "x,y,z") of coordinates specifies the location(SDTS).</p> |
| Segment Point Agreement | |
| Segment Point Airport | <p>Contains data pertaining to Airport features of the transportation mode at the specified end point.??</p> <p>Airport(s) -- an area of land or water that is used or intended to be used for the landing and takeoff of aircraft and includes its buildings and facilities, if any. For the purpose of these instructions, the term "airport(s)" includes airports, heliports, seaplane bases, stolports (short takeoff and landing airports), gliderports, ultralight flightparks, and balloonports except where a distinction is made in the text. - From: http://www.faa.gov/ARP/publications/acs/5200-35.pdf</p> |
| Segment Point Ferry | To be defined |
| Segment Point Rail | To be defined |
| Segment Point Type | To be defined |
| Segment Status | To be defined |
| Segment Mode | Defines the mode(s) that the segment supports; e.g. a multi-modal segment may be 'Road, Bike Lane, Light Rail', etc. |
| State County | Contains data pertaining to multiple counties associated with multiple states. |
| Structure Type | Contains information about the different categories of physical objects that may be located along a transportation mode. Examples include: Bridge, tunnel, etc. |
| Surface Type | Contains information about the different categories of materials that may form the portion of the transportation mode. Examples include: asphalt, concrete, cinder, crushed gravel, etc. |

WA-Trans Data Standards

4.0 Data Standards

4.1 Spatial Data Rules (Roland's list of rules thus far):

- 1) "At grade" feature intersections, it will always result in segmentation of the intersecting features regardless of mode. Intersections should be at 1st and 2nd order rail points to differentiate between at-grade crossings from under/overpass crossings.
- 2) Roads will be segmented at the beginning and end of bridges (and tunnels?).
- 3) Unique segment ID methodology as per FGDC standards will be utilized.
- 4) Segments will be broken at jurisdiction boundaries (city, county, state boundaries).
- 5) Segments may be broken at address anomalies (parity issues). Data owner, manager and contributor information to be listed under "authority" in the spatial database.
- 6) Segments may be broken at non-road intersections (hydro?)
- 7) A split of an existing segment will result in retirement of the original Segment ID and assignment of two new Segment IDs.
- 8) Any segment or segment point geometry edits, joins, or splits force an update of all associated events tables
- 9) Segment Point IDs will not change (facilitating their use as multi-modal transfer stations).
- 10) Linear features must match at jurisdictional boundaries.
- 11) Time/Date stamping shall be used to ensure proper records management, (versioning?) and adequate metadata.
- 12) FGDC compliant metadata shall be maintained for all address datasets.
- 13) Each jurisdiction shall document inconsistencies in their master street name database and in their master address database.

Questions for the next Steering Committee Meeting (6 December 2004):

- 14) Multi-modal segments will be accommodated with multiple features having coincident geography ("stacked arcs") – (Event Tables?) – **Open for discussion**
- 15) What "triggers" an address change/edit? – **Open for discussion**
- 16) Process for dealing with duplicate line work? – **Open for discussion**
- 17) Address element standardization? – **Open for discussion**
- 18) How do we deal with blank name or unnamed roads? – **Open for discussion**
- 19) Segmentation Rules - **When do we need a node instead of a vertex?**
- 20) Attribute Standardization - **Rules for addressing, street naming, etc.**
- 21) Update/Edit Tracking - **Rules for event table updates and segment ID evolution.**
- 22) Spatial Accuracy - **Rules regarding scale, edit tolerances and edge-matching**
- 23) State routes, county routes, city routes – **How should these be identified (concatenation?)**
- 24) Non-motorized routes – **How should business rules be applied?**

WA-Trans Data Standards

4.2 Rules for submission – See processed QA/QC

- Best available datasets must be topologically clean when in GIS format
- Line features should be contiguous across coverage boundaries (i.e. where a single geographic feature is split into adjacent coverages or tiles, it should be edge-matched).
- Every feature (point, line, etc) should have one attribute record.
- Each layer of submitted data needs to have complete attributes as designated by the required attribution section (3.1) above.
- Frequency updates will be established and a reminder will be set based data stewards previous submissions
- Must only submit data of which you are a steward (facility owner)
- All data will have metadata that will need to be signed off on with data submission.

WA-Trans Data Standards

5.0 Metadata Standards

Introduction

There are many approaches for documenting geographic data for archival purposes and day-to-day use. Some methods range from informal “read me” files discussing spatial reference information, lineage, and process steps to full FGDC metadata with every field being required and populated. WAGIC established metadata standards for “significant geo-datasets” as defined in the Geographic Information Technology Standards for Metadata. This requires the collection and posting of metadata in a specific approved format for an existing or proposed “significant geo-dataset” before December 30, 2004.

Approved language

It is the policy of WA-TRANS that the completed framework dataset will include metadata that meets the requirements of the Working Subset Metadata Standard of FGDC/CSDGM. There will be fields, such as depth system definition, depth datum name, and raster object information that will not apply to the WA-TRANS, and they will be coded as “N/A” in the completed metadata document. The original metadata schema itself will not be modified to remove these fields.

Background materials

- Geographic Information Technology Standards for Metadata
- WAGIC Basic Metadata Standard
- Working Subset Metadata Standard of FGDC/CSDGM

Intent

- Geographic data must be properly documented for it to be stored and retrieved without a loss of information.
- WA-TRANS is a very significant geo-dataset that requires proper and as complete documentation as possible.

Definitions:

- **Metadata** - "data about data" or "information describing content."
- **WAGIC** - Washington State Geographic Information Council
- **FGDC** - Federal Geographic Data Committee

Detailed research for proposed language:

I. [Geographic Information Technology Standards for Metadata](#)

“To facilitate implementation of this standard the WAGIC Basic and Working subsets of the FGDC Content Standard for Digital Geospatial Metadata are recognized as an approved implementation pathway.”

II. [WAGIC Basic Metadata Standard](#)

This is the minimum required documentation to meet the Geographic Information Technology Standard for metadata before December 30, 2004.

III. [Working Subset Metadata Standard](#) of FGDC / CSDGM.

The Working Subset includes a Basic Subset plus following shaded elements. This is the minimum required documentation to meet the Geographic Information Technology Standard for metadata after 30 Dec, 2004.

WA-Trans Data Standards

5.1 WAGIC Basic Metadata Standard

| ISB / WAGIC - Basic Metadata Subset From FGDC Content Standard for Digital Geospatial Metadata <i>Basic Subset - shaded areas identify actual data entry elements</i> | | | | |
|--|--|--|----------------|---------------|
| | Element Name | Element Definition | FGDC Hierarchy | sgml tag name |
| | Identification Information | Basic information about the data set. | 1 | idinfo |
| 1 | Title | The name by which the data set is known | 8.4 | title |
| 2 | Publisher | Name of individual or organization that published the data set | 8.8.2 | publish |
| | Description | A characterization of the data set, including its intended use and limitations. | 1.2 | descript |
| 3 | Abstract | A brief narrative summary of the data set. Domain: free text. | 1.2.1 | abstract |
| 4 | Purpose | A summary of the intentions with which the data set was developed. Domain: free text | 1.2.2 | purpose |
| | Time Period of Content | Time period(s) for which the data set corresponds to the ground. | 1.3 | timeperd |
| | Range of Dates / Times | Means of encoding a range of dates and times. | 9.3 | rngdates |
| 5 | Beginning Date | The first year (and optionally month, or month and day) of the event. Domain: "Unknown" free date | 9.3.1 | begdate |
| 6 | Ending Date | The last year (and optionally month, or month and day) for the event. Domain: "Unknown" "Present" free date | 9.3.3 | enddate |
| 7 | Currentness Reference | The basis on which the time period of content is determined. Domain: "Ground Condition" "Publication Date" free text | 1.3.1 | current |
| | Keywords | Words or phrases summarizing an aspect of the data set. | 1.6 | keywords |
| | Theme | Subjects covered by the data set | 1.6.1 | theme |
| 8 | Theme Keyword | Common-use word or phrase used to describe the subject of the data set. Domain: free text | 1.6.1.2 | themekey |
| | Place | Geographic locations characterized by the data set. | 1.6.2 | place |
| 9 | Place Keyword | The geographic name of a location covered by a data set. Domain: free text | 1.6.2.2 | placekey |
| | Data Quality Information | A general assessment of the quality of the data set. | 2 | dataqual |
| | Lineage | Information about the events, parameters, and source data which constructed the data set, and information about the responsible parties. | 2.5 | lineage |
| 10 | Source Information | List of sources and short discussion of the information contributed by each. | 2.5.1 | srcinfo |
| 11 | Source Time Period of Content | Time period(s) for which the source data set corresponds to the ground. Information about the date and time of an event. | 2.5.1.4 | srctime |
| | Range of Dates / Times | Means of encoding a range of dates and times. | 9.3 | rngdates |
| 12 | Beginning Date | The first year (an optionally month, or month and day) of the event. Domain: "Unknown" free date | 9.3.1 | begdate |
| 13 | Ending Date | The last year (and optionally month, or month and day) for the event. Domain: "Unknown" "Present" free date | 9.3.3 | enddate |
| | Entity and Attribute Information | Information about the content of the data set, including the entities types, their attributes, and the domains from which attribute values may be assigned. | 5 | eainfo |
| 14 | Overview Description | Summary of, and citation to detailed description of, the information content of the data set. | 5.2 | overview |
| 15 | Entity/Attribute Overview | Detailed Summary of the information contained in a data set. Domain: free text | 5.2.1 | eaover |
| | Point of Contact / Contact Information | Contact information for an individual or organization that is knowledgeable about the data set. Identity of, and means to communicate with, person(s) and organization(s) associated with the dataset. | 10 | ptcontac |
| 16 | Contact Person | The name of the individual to which the contact type applies. Domain: free text | 10.1.1 | cntper |
| 17 | Contact Organization | The name of the organization to which the contact type applies. Domain: free text | 10.1.2 | cntorg |
| 18 | Contact Position | The title of the individual. Domain: free text | 10.3 | cntpos |
| 19 | Contact Address | The address for the organization or individual. | 10.4 | cntaddr |
| 20 | Address Type | The information provided by the address. Domain: "Mailing Address" "Physical Address" "Mailing and Physical Address" | 10.4.1 | addrtype |
| 21 | Address | An address line for the address. Domain: free text | 10.4.2 | address |
| 22 | City | The city of the address. Domain: free text | 10.4.3 | city |
| 23 | State or Province | The state or province of the address. Domain: free text | 10.4.4 | state |
| 24 | Postal Code | The ZIP or other postal code of the address. Domain: free text | 10.4.5 | postal |
| 25 | Contact Voice Telephone | The telephone number by which individuals can speak to the organization or the individual. Domain: free text | 10.5 | cntvoice |
| 26 | Contact FAX Telephone | The telephone number of a FAX machine of the organization or individual. Domain: free text | 10.7 | cntfax |
| 27 | Contact E-Mail Address | The address of the electronic mailbox of the organization or individual. Domain: free text | 10.8 | cntemail |

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5.2 Working Subset Metadata Standard

Information Service Board Metadata Standard – Appendix A Approved Working Level Subset of FGDC/CSDGM (February 6th 2003)

| Working Subset includes Basic Subset plus following shaded elements | | |
|--|--|-----------------------|
| Element Name | Element Definition | FGDC Hierarchy |
| Status | The state of and maintenance information for the data set. | 1.4 |
| Progress | The state of the data set. Domain: "Complete" "In Work" "Planned" | 1.4.1 |
| Maintenance and Update Frequency | The frequency with which changes and additions are made to the data set after the initial data set is completed. Domain: "Continually" "Daily" "Weekly" "Monthly" "Annually" "Unknown" "As Needed" "Irregular" "None Planned" free text | 1.4.2 |
| Spatial Domain | The geographic areal domain of the data set. | 1.5 |
| Bounding Coordinates | The limits of coverage of a data set expressed by latitude and longitude values in the order western-most, eastern-most, northern-most, and southern-most. For data sets that include a complete band of latitude around the earth, the West Bounding Coordinate | 1.5.1 |
| West Bounding Coordinate | Western-most coordinate of the limit of coverage expressed in longitude. Domain: -180.0 <= West Bounding Coordinate < 180.0 | 1.5.1.1 |
| East Bounding Coordinate | Eastern-most coordinate of the limit of coverage expressed in longitude. Domain: -180.0 <= East Bounding Coordinate < 180.0 | 1.5.1.2 |
| North Bounding Coordinate | Northern-most coordinate of the limit of coverage expressed in latitude. Domain: -90.0 <= North Bounding Coordinate <= 90.0; North Bounding Coordinate >= South Bounding Coordinate | 1.5.1.3 |
| South Bounding Coordinate | Southern-most coordinate of the limit of coverage expressed in latitude. Domain: -90.0 <= South Bounding Coordinate <= 90.0; South Bounding Coordinate <= North Bounding Coordinate | 1.5.1.4 |
| Theme Keyword Thesaurus | Reference to a formally registered thesaurus or a similar authoritative source of theme keywords. Domain: "None" free text | 1.6.1.1 |
| Place Keyword Thesaurus | Reference to a formally registered thesaurus or a similar authoritative source of place keywords. Domain: "None" "Geographic Names Information System" free text | 1.6.2.1 |
| Access Constraints | Restrictions and legal prerequisites for accessing the data set. These include any access constraints applied to assure the protection of privacy or intellectual property, and any special restrictions or limitations on obtaining the data. Domain: "None" | 1.7 |
| Use Constraints | Restrictions and legal prerequisites for using the data set after access is granted. These include any access constraints applied to assure the protection of privacy or intellectual property, and any special restrictions or limitations on obtaining the d | 1.8 |
| Attribute Accuracy | An assessment of the accuracy of the identification of entities and assignment of attribute values in a data set. | 2.1 |
| Attribute Accuracy Report | An explanation of the accuracy of the identification of the entities and assignments of values in the data set and a description of the texts used. Domain: free text | 2.1.1 |
| Positional Accuracy | An assessment of the accuracy of the positions of spatial objects. | 2.4 |
| Horizontal Positional Accuracy | An estimate of accuracy of the horizontal positions of the spatial objects. | 2.4.1 |
| Horizontal Positional Accuracy Report | An explanation of the accuracy of the horizontal coordinate measurements and a description of the tests used. Domain: free text | 2.4.1.1 |
| Vertical Positional Accuracy | An estimate of accuracy of the vertical positions in the data set. | 2.4.2 |
| Vertical Positional Accuracy Report | An explanation of the accuracy of the vertical coordinate measurements and a description of the tests used. Domain: free text | 2.4.2.1 |
| Source Scale Denominator | The denominator of the representative fraction on a map (for example, on a 1:24,000-scale map, the Source Scale Denominator is 24,000. Domain: Source Scale Denominator > 1 | 2.5.1.2 |
| Source Contribution | Brief explanation identifying the information contributed by the source to the data set. Domain: free text | 2.5.1.6 |
| Spatial Data Organization Information | The mechanism used to represent spatial information in the data set. | 3 |
| Direct Spatial Reference Method | The system of objects used to represent space in the data set. Domain: "Point" "Vector" "Raster" | 3.2 |
| Raster Object Information | The types and numbers of raster spatial objects in the data set. | 3.4 – N/A |
| Raster Object Type | Raster spatial objects used to locate zero-, one-, and two-, and three-dimensional locations in the data set. Domain: "Point" "Pixel" "Grid Cell" "Voxel" | N/A - 3.4.1 |
| Spatial Reference Information | The description of the reference frame for, and the means to encode, coordinates in the data set. | 4 |
| Horizontal Coordinate System Definition | The reference frame or system from which linear or angular quantities are measured and assigned to the position that a point occupies. | 4.1 |
| Planar | The quantities of distances or, or distances and angles, which define the position of a point on a reference plane to which the surface of the Earth has been projected. | 4.1.2 |

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Working Subset includes Basic Subset plus following shaded elements - continued

| Element Name | Element Definition | FGDC Hierarchy |
|---------------------------------------|--|----------------|
| Grid Coordinate System | A plane-rectangular coordinate system usually based on, and mathematically adjusted to, a map projection so that geographic positions can be readily transformed to and from plane coordinates. | 4.1.2.2 |
| Grid Coordinate System Name | Name of the grid coordinate system. Domain: A code table | 4.1.2.2.1 |
| State Plane Coordinate System (SPSC) | A plane-rectangular coordinate system established for each state in the United States by the National Geodetic Survey. | 4.1.2.2.4 |
| SPCS Zone Identifier | Identifier for the SPCS zone. Domain: Four-digit numeric code for the State Plane Coordinate Systems based on the North American Datum of 1983 are found in Department of Commerce, 1986, Representation of geographic point locations for information interchange | 4.1.2.2.4.1 |
| Planar Coordinate Information | Information about coordinate system | 4.1.2.4 |
| Planar Distance Units | Units of measure used for distance | 4.1.2.4.4 |
| Geodetic Model | Parameters for the shape of the Earth. | 4.1.4 |
| Horizontal Datum Name | The identification given to the reference system used for defining the coordinates of points. Domain: "North American Datum of 1927" "North American Datum of 1983" free text | 4.1.4.1 |
| Ellipsoid Name | Identification given to established representations of the Earth's shape. | 4.1.4.2 |
| Semi-major Axis | Radius of the equatorial axis of the ellipsoid | 4.1.4.3 |
| Denominator of Flattening Ratio | The denominator of the ratio of the difference between the equatorial and polar radii of the ellipsoid when numerator is set to 1. | 4.1.4.4 |
| Vertical Coordinate System Definition | The reference frame or system from which vertical distances (altitudes or depths) are measured | 4.2 |
| Altitude System Definition | The reference frame or system from which altitudes (elevations) are measured. The term "altitude" is used instead of the common term "elevation" to conform to the terminology in Federal Information Processing Standards 70-1 and 173 | 4.2.1 |
| Altitude Datum Name | The identification given to the surface taken as the surface of the reference frame from which altitude is measured | 4.2.1.1 |
| Depth System Definition | The reference frame of system from which depths are measured | 4.2.2 – N/A |
| Depth Datum Name | The identification given to surface of reference from which depths are measured | N/A - 4.2.2.1 |
| Detailed Description | Description of the entities, attributes, attribute values, and related characteristics encoded in the data set. | 5.1 |
| Entity Type | The definition and description of a set into which similar entity instances are classified. | 5.1.1 |
| Entity Type Label | The name of the entity type. Domain: free text | 5.1.1.1 |
| Entity Type Definition | The name of the entity type. Domain: free text | 5.1.1.2 |
| Attribute | A define characteristic of an entity. | 5.1.2 |
| Attribute Label | The name of the attribute. Domain: free text | 5.1.2.1 |
| Attribute Definition | The description of the attribute. Domain: free text | 5.1.2.2 |
| Attribute Domain Value | The valid values that can be assigned for an attribute. | 5.1.2.4 |
| Enumerated Domain | The members of an established set of valid values. | 5.1.2.4.1 |
| Enumerated Domain Value | The name or label of a member of the set. Domain: free text | 5.1.2.4.1.1 |
| Enumerated Domain Value Definition | The description of the value. Domain: free text | 5.1.2.4.1.2 |
| Range Domain | The minimum and maximum values of a continuum of valid values. | 5.1.2.4.2 |
| Range Domain Minimum | The least value that the attribute can be assigned. Domain: free text | 5.1.2.4.2.1 |
| Range Domain Maximum | The greatest value that the attribute can be assigned. Domain: free text | 5.1.2.4.2.2 |
| Codeset Domain | Reference to a standard or list which contains the members of an established set of valid values. | 5.1.2.4.3 |
| Codeset Name | The title of the codeset. Domain: free text | 5.1.2.4.3.1 |
| Codeset Source | The authority for the codeset. Domain: free text | 5.1.2.4.3.2 |
| Attribute Units of Measurement | The standard of measurement for an attribute value. Domain: free text | 5.1.2.5 |
| Attribute Measurement Resolution | The smallest unit increment to which an attribute value is measured. Domain: Attribute Measurement Resolution > 0.0 | 5.1.2.6 |
| | | |
| Citation Information | The recommended reference to be used for the data set. | 8 |
| Originator | The name of organization or individual that developed data set. | 8.1 |
| Publication Date | Date dataset published | 8.2 |
| Title | The recommended name of dataset | 8.4 |

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6.0 Data Quality

6.1 Quality Assurance and Quality Control (Phase II)

Quality assurance and quality control (QA/QC) are the processes and tools, which establish and enforce data consistency and data accuracy. In an environment where data is being integrated from multiple sources, it is a critical function. Software can be built to enforce QA/QC in the following categories:

- Topological – checks regarding connectivity of the line work at intersections, overpasses and bridges represented as separate features, arcs meeting at jurisdictional boundaries, etc.
- Scale/Spatial – Does the location accuracy meet the planned business use of the data, does the “aesthetic” representation of the transportation feature meet the business requirements?
- Attribute – Are the minimum required fields included, are the field descriptions met, how many of the attributes are populated, are the attribute values valid?
- Metadata – Concerns regarding metadata include: has the required metadata been provided, is it complete, does it conform to established metadata standards; does the metadata match the layer?

All of these are standard GIS requirements for checking data and when the environment is one of handling data from a variety of sources, it is critical that they be supported with software tools to facilitate efficient checking and validation.

6.2 Data Scale (Expressed targets)

| This will be a multi-scale dataset | | | |
|------------------------------------|----------|----------|-----------|
| Urban | 1:1,200 | 1:6,000 | 1:24,000 |
| Rural | 1:6,000 | 1:24,000 | 1:48,000 |
| Remote | 1:24,000 | 1:48,000 | 1:100,000 |

6.3 Data Accuracy (Expressed targets)

| | Urban | | | Rural | | | Remote (Agriculture / Forestry) | | |
|------------------------|---------|----------|--------|---------|---------|---------|---------------------------------|---------|---------|
| | High | Medium | Low | High | Medium | Low | High | Medium | Low |
| Spatial Accuracy | 1 ft. | 5 ft. | 40 ft | 5 ft | 40 ft | 50 ft | 40 ft. | 50 ft. | 100 ft. |
| Update Frequency | 1 month | 6 months | 1 year | 1 year | 2 years | 3 years | 1 year | 2 years | 5 years |
| Attribute Completeness | 95% | 80% | 70% | 95% | 80% | 70% | N/A | N/A | N/A |
| Source Scale | 1:1,200 | 1:6,000 | 1:24 K | 1:6,000 | 1:24 K | 1:48 K | 1:24 K | 1:48 k | 1:100 K |

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7.0 Stewardship

7.1 Update Cycles

- Need decisions on best available data for each data layer and/or scale.
- Here data could be submitted to source agency when concatenating with tabular or spatial data. If this is acceptable this will reduce the need to concatenate data repeatedly with each update cycle.
- Also will need to define a regular update cycle for data. Many agencies have an annual update cycle based on budget cycle. Would this dictate framework update cycle? Yearly updates, quarterly?

8.0 Data Layers

8.1 Core Data Sets:

- State Highway
- Highway Ramps – WSDOT naming convention
- Milepoint / Milepost
- Scenic Roads - attribute
- Local Roads
- Tribal Road Designators
- Non-Motorized Transportation Modes
- Railroads
- Port Facilities
- Ferry Transit Routes – include ferry terminal locations, includes staging areas as segments and connector roads
- Aviation – includes airport locations, connector roads and runway segments

8.2 Reference (Boundary) Datasets:

- County Boundaries
- Reservation Boundaries
- City boundaries – too dynamic?

8.3 Supporting Datasets:

- CRIS Data – Core attribution
- Survey Data – Core attribution
- Bridges, culverts – attribute (event), eventually BEarms for bridge

8.4 Interfaces

- Mobility
- Geospatial One-stop

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10.0 References

- All Roads (HARP), ODT, Watterson and Brady, 2003 v5 draft
- ANSIT, Geographic Information Framework-Data Content Standards for Transportation Networks: Roads
- Oregon Road Centerline Standard, ODT, V.2, 2003 draft
- Michigan Framework – web
 - http://www.michigan.gov/cgi/0,1607,7-158-12759_14194---,00.html
- Arizona Framework – web
- Dueker white paper
- King Co Standards
 - http://www.metrogis.org/data/standards/address_guidelines.shtml
- Minnesota Data Standards
 - <http://www.co.clay.mn.us/Depts/GIS/GISDStan.htm>
- [1] WAGIC Metadata
 - http://wagic.wa.gov/techstds2/wl_subsetv1.htm
- Geospatial One Stop
 - <http://www.geo-one-stop.gov/Standards/Base/index.html>

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Appendix B – WA-Trans Glossary

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Terms found in the WA-Trans Standards document (November 18, 2004)

| Abbreviation | Description |
|-------------------|--|
| LLRS | Linear Location Reference System |
| LRS | Linear Reference System (PDF) |
| CRAB | Country Road Administration Board (Washington) |
| CRIS | County Road Information System (Washington) |
| PSRC | Puget Sound Regional Council |
| NAD | North American Datum |
| ISB | Information Services Board (WSDoT Geographic Information Technology Subcommittee) |
| FGDC | Federal Geographic Data Committee |
| CSDGM | Content Standard for Digital Geospatial Metadata (Working subset metadata standard) |
| NSDI | National Spatial Data Infrastructure |
| WAGIC | Washington State Geographic Information Council |
| CAD | Computer Aided Design |
| CADD | Computer Aided Design & Drafting |
| GIS | Geographic Information System |
| GPS | Global Positioning System |
| WSDOT/WSDoT | Washington State Department of Transportation |
| WA-Trans/WA-TRANS | Washington Transportation Framework for GIS |
| ODOT | Oregon State Department of Transportation |
| MPO | Metropolitan Planning Organization (e.g. COG, SRTC etc.) |
| FMG | Framework Management Group (WAGIC) |
| USGS | United States Geological Survey |
| USFS | United States Forest Service |
| USPS | United States Postal Service |
| (WA) DNR | (Washington State) Department of Natural Resources |
| USGS DLG | United States Geological Survey Digital Line Graph (USGS format digital vector representation of cartographic information) |
| GDT | Geographic Data Technology (Commercially available integrated roadway data) |
| GBF | Geographic Base File |
| MSAG | Master Street Address Guide (911 data) |
| NCHRP | National Cooperative Highway Research Program |
| LOS | Level of Service |
| BMS | Bridge Management Systems |
| PMS | Pavement Management Systems |
| NHS | National Highway System |
| IRICC | Interagency Resource Information Coordinating Council |
| REO | Regional Ecosystem Office |
| BLM | Bureau of Land Management |
| TIGER | Topologically Integrated Geographic Encoding and Referencing - US Census database with roads and street addresses |
| BLM GTN | BLM Ground Transportation (Roads & Trails) |

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| | |
|------------|--|
| SDTS | Spatial Data Transfer Standard |
| NIMA | National Imagery and Mapping Agency (USGS) |
| <u>CTM</u> | Cooperative Topographic Mapping (USGS) |
| COG | County Council of Governments |
| WAGDA | Washington Geospatial Data Archive (U of W) |
| WUTC | Washington Utilities and Transportation Commission |

| Abbreviation | Description |
|------------------|--|
| <u>AUTHORITY</u> | Any organization that takes responsibility for proposing, designating or working in partnership with other organizations to build and maintain the actual physical infrastructure, or the data being submitted to WA-Trans. This is the entity/agency that has the authority to make decisions about the physical infrastructure or the data in question. The “authority” may be the owner of the physical infrastructure (PI), the maintainer of the PI, or the owner, provider, maintainer or contributor of the data being submitted to WA-Trans (all of which can differ from the PI owner). |
| DATA OWNER | The entity/agency that legally owns, and has legal authority and responsibility over the data (i.e. the one who has legal authority to make decisions regarding the data) |
| DATA PROVIDER | The entity/agency that has legal authority to provide data to WA-Trans (i.e. this could be the data owner, or a third party providing data on behalf of a data owner) |
| DATA MAINTAINER | The entity/agency that has legal authority to make changes to the data provided to WA-Trans (i.e. this could be the same as the data owner or provider, but it could also be a third party working with and on behalf of the owner or provider) |
| DATA CONTRIBUTOR | An entity/agency that provides portions of data to a larger data set. This could be a GPS collected line segment, point or a group of data that is more up-to-date than a portion of the data it is meant to update. The data contributor could be the data owner, data provider, a data maintainer, or a third party working on behalf of a data owner, data provider or a data maintainer. |
| DATA STEWARD | Synonymous with data maintainer |
| SEGMENT (Line) | A segment is spatial data term meaning a line that has a start and an end point. The line between the points (nodes) can be straight or curved. |
| EVENT | A geographic location stored in tabular rather than spatial form that can be related directly to a spatially congruent entity. Event types include address events, route events (that depict occurrences along a linear entity), x y events, and temporal events, all of which can be viewed in a GIS as if it were a part of the spatial data. |
| POINT | A point is a single object with a specific geographic location. Point data can be based on dynamic segmentation of roadways (using mileposts or distance from intersection), x, y coordinates from GPS, or geocoded addressing information. It is typically a zero-dimensional abstraction of an object that usually represents a geographic feature too small to be displayed as a line or area at that scale. |
| POLYGON | A polygon is a closed, two-dimensional figure with at least three sides that represents an area. It is used in GIS to describe spatial elements with a discrete area, such as parcels, political districts, homogeneous land use, and soil types. Polygon data layers will be used as a reference for clipping other data layers. |
| SEGMENT MODE | The mode of transportation associated with a particular line segment |
| FEATURE | A representation of a real-world object on a map. Features can be represented in a GIS as vector data (points, lines, or polygons) or as cells in a raster data format. Features can also |

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| | |
|----------|--|
| | be a group of spatial elements that together represent a real-world entity. A complex feature is made up of more than one group of spatial elements: for example, a set of line elements with the common theme of roads representing a road network. |
| TOPOLOGY | The geometric relationships, determined mathematically, between connecting or adjacent features in a geographic data set. Topology may include information about connectivity, direction, length, adjacency, and polygon definition. Topology is what makes most types of geographic analysis possible because it allows analysis of spatial relationships between features. |

| Abbreviation | Description |
|--------------|---|
| ATTRIBUTE | Descriptive information about a geographic feature in a GIS that is usually stored in a database table and linked (related) to the feature by a unique identifier. For example, attributes of a river might include its name, length, and average depth. |
| METADATA | Properties and documentation about the content, quality, condition, and other characteristics of data. Metadata for geographic data may document its subject matter; how, when, where, and by whom the data was collected; accuracy; availability, distribution information, projection, scale, resolution, accuracy, and its reliability with regard to some standard. Not to be confused with attribute data, which describes the feature in the real world (as noted above). |
| CONCATENATE | To join two or more character strings together, end to end, which will create one unique string. |
| CONFLATION | A set of procedures that aligns the features of two geographic data layers and then transfers the attributes of one to the other. |

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Appendix C – Letter Regarding Data Model and Addresses

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Thursday, October 28, 2004

RE: WATrans Data Model

From: Chuck Buzzard GISP, Senior Analyst, Pierce County GIS

Purpose: This letter will identify concerns with the current model proposal and suggest alterations that address these concerns.

I would like to express my sincere thanks and admiration for the work Tami Griffin, Jerry Harless, Roland Behee and many others have put in to the development of this model. The design and logical model are a fine piece of work and shows a well thought out process. This design should work well for transit and transportation planning agencies.

During the initial design phase of WA-Trans by the Steering Committee, a considerable effort was made to identify and rate business needs. These needs were collected from a wide array of transportation professions throughout Washington State and included Tribal, State, Regional and Local jurisdictions. The top five categories rated as must haves (Event Location Analysis and Mapping, Geo-coding/Event-mapping, Map Production, Mapping using Address Matching, Accurate centerline and right-of-way line work, Street Names) were focused on address matching, locating events and general mapping. General cartography requires graphics that depict the transportation network labeled with road names. Just about any data model will provide this level of functionality.

Locating events requires transportation segments contain a route identifier, from measure and to measure fields. These fields are then used to create a linear referencing structure that facilitates the assignment of map coordinates based on events collected using the route, from and to measurement attributes. Transportation related linear referencing systems are usually roughly based on driving distance along a particular route. Each route is assigned a route identifier and the measures often begin at zero (at an intersection) and measures accumulate to the end of the route. Each segment (from intersection, to intersection) is assigned a from measure (the accumulated distance from the previous segment) and a to measure (the from measure plus the distance to the to measure). Most County data is collected in hundredth of a mile increments. So a route has a distinct direction defined by its from measure, to measure structure and each route segment is unique by combining route-id, from-measure and to-measure field values.

Locating addresses (geo-coding) works similarly to linear referencing, but requires a more complicated data structure. Since an address does not fall on the street segment, but is located to the left or right of the segment the system must be able to place an address on the correct side of the street. This requires two sets of measurements: Left-from, left-to, right-from, right-to ranges. Also instead of a route identifier, street names are made of a set of elements that vary by jurisdiction or neighborhood. A street name can consist of prefix direction, prefix type, street name, suffix type and suffix direction. Address ranges increase in a particular direction and are partitioned into quadrants (NE, NW, SE, SW). The routines used to locate addresses do the following: partition house number and street name elements, finds possible matches in the road segments layer, ranks the possibilities, and returns these to the calling application. In order to get emergency vehicles as close to the correct location as possible, address ranges are limited to a small range of existing house numbers for each road segment. These are called actual addresses. Some jurisdictions take the opposite approach by using theoretical address ranges, where the segment gets assigned the largest range possible for a street segment. An example would be the 100 block of Main St would be assigned a left range of 100 – 198 and a right range of 101 – 199. In addition to the above mentioned attributes, addresses are also defined by areas such as city boundaries and zip-code boundaries. Road segments are split to differentiate these zones and the address fields are updated to maintain

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integrity. Zones are required because jurisdictions often maintain their own address grid based on their own address rules. So an addressed road segment has a distinct direction defined by its from ranges, to ranges structure and each addressed segment is unique by combining road name elements, from ranges and to ranges field values.

The current model as proposed takes collections of transportation segments from a variety of sources; extracts and normalizes attributes into a number of tables; and combines the geography into a single table. The data come from different jurisdictions, are of different scales of accuracy and contain several different modes of travel. The model must support replacing poorer quality data with higher accuracy data as it becomes available. All this must be completed with little or no human intervention and the integrity of the data must be maintained.

My concern about the model as it is currently proposed centers around the combination of transportation modes into a single geography. In order for this combination to be accomplished, roads, railroads and trails must be intersected together. When a road segment is split, it produces two road segments with the same attribution. This breaks the unique identity of each route segment and addressed road segment. In order for a segment's unique identity to be restored, the directionality of the addressed segment, and the route segment must be determined. Often these two systems do not point in the same direction. Then the address ranges and route measures must be pro-rated based on arc length of the two new segments as a portion of the original arc length. Technically this is possible and can be accomplished. What is not possible, and unfortunately it happens quite frequently, is where multiple rail lines intersect road segments within a few feet of each other. How can actual address ranges be pro-rated, when there is not enough house numbers on the original segment to cover the number of splits in the original road segment? A series of business rules may be developed to handle these types of situations, but it quickly becomes a quagmire of complexity.

Another issue with the current model comes from a computer aided dispatch (CAD) system use of these data. Since there is a legal requirement for these systems to be able to respond within two minutes of a 911 call, administrators of these systems limit the number of records (road segments). By intersecting the modes of transportation into a single geography, many additional records are generated for existing jurisdictions. This will greatly reduce the usability of WA-Trans data for emergency dispatch.

A final issue is concerned with maintenance of the dataset. By placing all the transportation modes into a single geography, a co-mingling of data of different qualities occurs through out jurisdictional boundaries. Each time a higher quality dataset is submitted the old dataset must be removed and all intersections at mode crossings must be removed, before the new dataset can be added. When each mode has separate geography tables, the poor data is removed for a jurisdiction, the new data replaces the old, and the new data is snapped to the jurisdictional boundary points.

There are other scenarios I could present, but I hope I have made my point. By forcing all transportation modes into the same geographic layer, we are reducing the usability of the data and greatly increasing the complexity of the model. My proposal for a solution rests in changing the model to allow each mode to have its own geography table. There could also be a combined geography table for those business needs that require this type of implementation, or this might be a product developed from the separate geography tables.

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Appendix D – Questions Regarding the Data Model

QUESTIONS: WA-TRANS FRAMEWORK

I. From: **Brian Jones**
II. Subject: **Transportation Framework**
III. Date: **October 18, 2004**
IV.

Questions about the model

1. When the segment Geometry changes and we retire a segment, how do we 'flag' that the events that are related to that segment need to be re-validated and possibly updated?
2. Is it probable/possible that we will need multiple records to completely 'attribute' a segment?
 - a. Using a Road mode segment as an example. Suppose the general description attributes and possibly the Road 'Name' attributes, are provided by WSDOT. But the 'address' attributes are provided by a county, such as Pierce County.
 - b. Can we include a field in the description table(s) called "Preferred Flag" –indicating that a mode-specific segment description record; (e.g. a record in the Segment Description Road table for example); is the 'authoritative' set of attributes for that segment.
3. The document *NSDI-Trans-Public_Review.pdf* states the following in regards to Segments:
 - a. Section 2.3.2.2: An FTSeg record must include an **Intermediate-Point** consisting of a single FTRP-ID whenever the FTSeg in question has the same From-End-Point and To-End-Point as one or more other FTSeg. The additional FTRP identified in this field should represent an intermediate point along the FTSeg, judiciously selected in order to assure that the multiple FTSeg which terminate at the same FTRP are unambiguously differentiated. Pairs of FTSeg for which the To-End-Point and From-End-Point are reversed will occur routinely; they must be assigned different unique FTSeg identifiers, but need not have Intermediate-Points. (pp. 37, line 560).

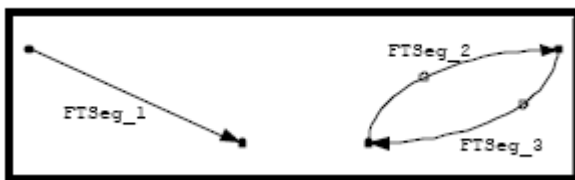


Figure 2 – Unique pathways connecting two FTRP
(Section 2.3.2, pp 32, ~ line 509)

- i. We have not included anything like this in the model. Is this something we wish to include?

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Appendix E – Options for Storing Event Data in WA-Trans Data Model

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11/23/2004

Michelle Blake

WSDOT GIS Data Administrator

Background: To meet identified business needs, the WA-Trans database must store and make available information on various modes of travel – including legal speed limits, surface types, structures, number of lanes, etc. Data like this is often maintained by transportation departments in legacy tabular systems. Traditionally, ESRI event tables have been utilized by transportation organizations to depict such data relative to a GIS linear referencing system. In recent years, other methods have been employed to create a tighter relationship between such features and their geographic location.

This document suggests some possible options for the WA-Trans Steering Committee and Data Model Committee to consider.

1. Use the traditional ESRI method of using route/milepost or address information to place tabular information as either lines or points along a data set constructed to show the relative locations of such items along an established linear referencing system.

(This is what we currently have modeled in the database.)

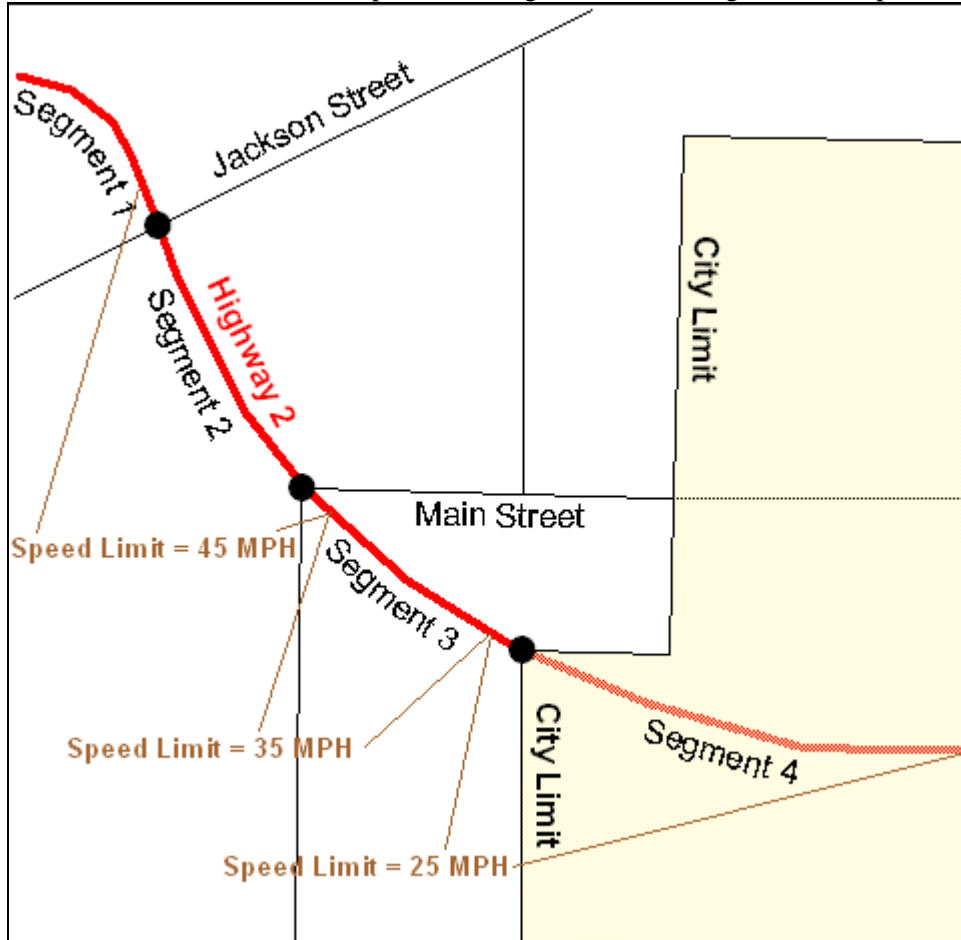
Pros: Several entities utilize this construct for transportation data – especially for data that is maintained in tabular systems outside of a GIS. This structure minimizes the number of records required to geographically depict features.

Cons: Care has to be taken that data not get out of sync. A realignment along a particular segment may cause an existing event feature to change position or to cease to exist. Business rules may need to make sure that a provider of event data also provides segment description information for placement use. Similarly, we may want to set business rules to ensure that an infrastructure owner provide their segment description information – even if they provide nothing else.

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2. Store event information as a percentage along a segment.

In this construct, a record is created for each segment that is involved in an event. The event data is stored in its own table – not as part of the segment table or segment description table.



Using this method, the resulting event table would look like:

| SegmentID | SpeedLimit | BeginPercentage | EndPercentage |
|-----------|------------|-----------------|---------------|
| 1 | 45 | 85 | 100 |
| 2 | 45 | 0 | 100 |
| 3 | 45 | 0 | 10 |
| 3 | 35 | 10 | 85 |
| 3 | 25 | 85 | 100 |
| 4 | 25 | 0 | 100 |

Pros: This structure maintains a tight tie between the segment and the event, which could improve the ability to keep data in sync.

Cons: This may take additional time for data loading and extraction. The structure results in the addition of many additional records in the database. We may need to include the direction field in the Segment table instead of in the Segment Description table.

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3. Store all data currently stored in event tables as attribute data for each .001 of a mile of a given feature.

This method utilizes a standard tabular Data Mart method of storing data. In this case, the database is restructured into a less normalized model with fewer tables housing more attributes.

Pros: Data is stored at the most granular level. This method is used frequently in tabular Data Marts.

Cons: Additional work may need to be done to create processes to find beginning and ending points for certain types of features (like speed limits, jurisdictions, surface types, etc.). This may increase extraction and loading time. This structure can result in large databases very quickly – 100,000,000 records for roads alone, not including historical data or the decreasing travel direction.

Action Items

| WA-Trans Steering Committee Action Items List | | | |
|---|---------------------|--------------------------|-------------------|
| What | Who | When | Status |
| Provide Ian with specific feedback on WAGIC Standards | Tami | ASAP | Assigned |
| Work with WAGIC to get the standards published on the Internet in better shape. | Ian | After receiving feedback | Assigned |
| Make sure rooms and video conferencing are scheduled for April, July and October SC meetings. | Tami | ASAP | Assigned |
| Change the standard to reflect decisions and notes made in the Dec. 6 meeting | Mark | ASAP | Assigned |
| Change the data model based upon discussion of standards and the model itself. | Brian | December 10 | Assigned |
| Send Gary at Bfirst Solutions, Inc. critical metadata information. | Tami | ASAP | Assigned |
| Send G Send Gary at Bfirst Solutions, Inc. updated data model and standards. | Tami | December 13 | Assigned |
| Work with data modeling group to identify a structure for business rules documentation and maintenance | Tami | ASAP | Assigned |
| Send out notice of feedback for glossary | Tami | ASAP | Complete |
| Update glossary based on feedback and put in standards document | Mark | December 13 | Assigned |
| <i>Develop Pooled Fund Solicitation</i> | <i>Tami</i> | <i>November 5, 2004</i> | <i>In Process</i> |
| <i>Take updated standards and identify naming issues between state and local agencies so the translator and look for them</i> | <i>Dave Rideout</i> | <i>November 24, 2004</i> | <i>Assigned</i> |
| <i>Develop draft process for a cross walk between various road/transportation classification systems</i> | <i>Pat</i> | <i>January 17, 2005</i> | <i>In Process</i> |

Note: *Italicized items are prior to current meeting but are still outstanding unless otherwise stated. Colored items are critical to other things being completed and should be looked at as high priority.*

Meeting Date: 12/16/2004

| WA-Trans Steering Committee Action Items List | | | |
|---|---------------------------------|--------------------------|--------------------|
| What | Who | When | Status |
| <i>Develop standards for ramps</i> | <i>Tareq, Pat, Art</i> | <i>November 29, 2004</i> | <i>Complete</i> |
| <i>Develop draft process for dealing with scale and accuracy</i> | <i>Jerry</i> | <i>November 29, 2004</i> | <i>Assigned</i> |
| <i>Develop draft process for inventory of gaps in data (including attribution) for prioritization of data acquisition</i> | <i>Jerry</i> | <i>January 17, 2005</i> | <i>Assigned</i> |
| <i>Develop draft processes and policy for establishing agreement points</i> | <i>Michelle</i> | <i>January 17, 2005</i> | <i>Assigned</i> |
| <i>Develop draft process for providing feedback to data providers and correction of data</i> | <i>Chuck</i> | <i>January 17, 2005</i> | <i>Assigned</i> |
| <i>Develop draft process for reconciling segment schemes</i> | <i>Chuck</i> | <i>January 17, 2005</i> | <i>Assigned</i> |
| <i>Develop draft policies to support Strategies for resolving more than one source of data</i> | <i>Dave R.</i> | <i>January 17, 2005</i> | <i>Assigned</i> |
| <i>Develop draft policies regarding contact through which data should be authorized</i> | <i>Dave R.</i> | <i>January 17, 2005</i> | <i>Assigned</i> |
| <i>Develop draft strategies for dealing with jurisdictions with no data.</i> | <i>Dave R., Wendy</i> | <i>November 29, 2004</i> | <i>Assigned</i> |
| <i>Update time tracking spreadsheet with salary/benefit information.</i> | <i>All SC Members</i> | <i>November 1, 2004</i> | <i>In progress</i> |
| <i>Update time tracking spreadsheet with accurate hours (as much as possible)</i> | <i>SC Members prior to 2004</i> | <i>November 1, 2004</i> | <i>In progress</i> |
| <i>Investigate adding a bike path field to roads core attribution</i> | <i>Dave R.</i> | <i>August 6</i> | <i>Assigned</i> |
| <i>Check with WSDOT Pedestrian and bike people about data</i> | <i>Tami</i> | <i>August 23</i> | <i>Assigned</i> |
| <i>Check into WA Bicycle Alliance with non-motorized staff person at PSRC</i> | <i>Jerry</i> | <i>August 27</i> | <i>Assigned</i> |
| <i>Work with Bfirst Systems Inc. to develop detailed requirements for the translator</i> | <i>Jerry, Chuck, Tami</i> | <i>December 31, 2004</i> | <i>In Process</i> |
| <i>Write letters supporting WA-Trans and</i> | <i>All SC</i> | <i>ASAP!!! -</i> | <i>PSRC,</i> |

Note: *Italicized items are prior to current meeting but are still outstanding unless otherwise stated. Colored items are critical to other things being completed and should be looked at as high priority.*

Meeting Date: 12/16/2004

| WA-Trans Steering Committee Action Items List | | | |
|--|----------------|----------------------------------|--|
| What | Who | When | Status |
| <i>funding of WA-Trans on letterhead of their organizations (Looking for letters regarding emergency management from emergency operations specifically right now.)</i> | <i>Members</i> | <i>February 6 would be best!</i> | <i>Community Transit, WUTC, Pierce County are complete</i> |

| WA-Trans Steering Committee Tabled Action Items | | | |
|---|--------------------|--|-----------------|
| What | Who | When | Status |
| <i>Meet with the WSDOT assistant Attorney General to discuss this issue and get guidance on what our options are.</i> | <i>Tami</i> | <i>When completed with Tier 2 description and issues</i> | <i>Assigned</i> |
| <i>Provide results from CRAB survey to WA-Trans.</i> | <i>Dan</i> | <i>When completed</i> | <i>Assigned</i> |
| <i>Work with Sound Transit to test pilot results in their core area.</i> | <i>Tami, Jerry</i> | <i>ASAP</i> | <i>Assigned</i> |

Note: *Italicized items are prior to current meeting but are still outstanding unless otherwise stated. Colored items are critical to other things being completed and should be looked at as high priority.*

Meeting Date: 12/16/2004

Tami's Status Report Steering Committee Meeting; December 6, 2004

We have met with Bfirst Solutions Inc. to gather requirements for the WA-Trans Translator. We have provided them with most of the documents and information they need. We expect to have a first draft of requirements the week of December 6 – 10th sometime. They will change as we finalize the data model and standards. Just a few more decisions to make!!

I have hired Mark Hotz to be my Assistant Project Manager. Many of you met Mark at the last meeting. Mark is Canadian and has almost 10 years experience in GIS. He is currently seeking an advanced degree in GIS and is very interested in project management. I am excited to have him here and have already loaded him with work!

I am seeking an executive sponsor for the project in WSDOT. We have asked Paula Hammond to do this for us and it appears she will do it! Paula is the Chief of Staff and reports directly to Secretary McDonald. Many of the business areas with great interest in WA-Trans report to her so she is a logical choice.

I gave a presentation on WA-Trans to the Geographic Information Technology subcommittee (GIT) of the Information Services Board (ISB). Attendees represented the Departments of Ecology, Fish and Wildlife, Health, Information Services, Local Government Representative, Military, Natural Resources, Transportation, US Geological Survey and the current chair of WAGIC (Ian Von Essen). I was able to emphasize the "enterprise" value and place of WA-Trans and begin planting seeds regarding long-term maintenance and planning for it.

I attended the national URISA conference in Reno last month. I was able to network with several people that may end up being helpful. First, I was able to speak with Carol Brandt at the USDOT Bureau of Transportation Statistics. She is their GIS Program Manager and has overseen the Geospatial One Stop for Transportation. They are beginning to do cost-benefit analysis on Geospatial One Stop and they want to partner with state DOT's and she was very interested in what we are doing with WA-Trans. Since then I have heard from Mark Bradford, who works for her and been invited to join the FGDC Business Case Action Team. I am looking into what that involves and will decide later.

I also was able to connect with GIS managers from several DOT's (Tennessee, Oklahoma, Idaho, and others) and start soliciting their interest in the pooled fund project. I have their contact information and can appeal to them directly later.

Our next meeting is January 24 from 9 a.m. to 2 p.m. in Spokane at the WSDOT Eastern Region HQ on 2714 N. Mayfair in the Pend Orielle Room. Video-conferencing will be available.

WA-Trans Steering Committee Meeting Notes October 25, 2004

Attendees:

| Member | Association | Representing |
|----------------|--|---|
| Tareq Al-Zeer | WSDOT | WSDOT |
| Roland Behee | Community Transit | Transit Organizations |
| Sam Bardelson | US Geological Survey Washington Liaison | The National Map |
| Michelle Blake | WSDOT GIS Data Administrator | WSDOT |
| Chuck Buzzard | Pierce County GIS | West side local government |
| Dave Cullom | Washington Utilities and Transportation Commission | Pipelines, Utilities, Railroad |
| Tami Griffin | WSDOT Geographic Services | WA-Trans (Project Manager), Facilitator |
| Jason Guthrie | Lincoln County | East side local government |
| Jerry Harless | Puget Sound Regional Council | MPO's, RTPPO's |
| Wendy Hawley | Census Bureau | US Bureau of Census |
| Mark Hotz | WSDOT Geographic Services | WA-Trans (Assistant Project Manager) |
| Brian Jones | WSDOT Office Information Technology | WSDOT Data Modeling |
| Chris Madill | Washington State Patrol | Washington Traffic Records Committee |
| Dave Rideout | Spokane County Engineers Office | Spokane County |
| Art Shaffer | WSDOT NW Region Maintenance & Ops | Alternate WSDOT |
| Ian Von Essen | Spokane County GIS | E-911 |
| Pat Whittaker | WSDOT Transportation Data Office | WSDOT Transportation Data Office |

Not Attending:

| Member | Association | Representing |
|--------------------|------------------------------------|------------------------|
| Dan Dickson | CRAB | CRAB |
| Tony Hartrich | Quinault Indian Nation | Quinault Indian Nation |
| Elizabeth Stratton | WSDOT | Freight Interests |
| Dave Wolfer | WA Department of Natural Resources | WADNR |

- Introductions, Status Questions, Time Tracking, Action Item Review
- Schedule Information (added at meeting time)
- Metadata Standards
- Data Users Front End
- Data Model Report
- Toolset Description for pooled fund solicitation
- Translator Update
- Policies and Processes
- ~~Front End for Data Providers~~ (rolled in with translator discussion)
- Traffic Records Strategic Plan and WA-Trans
- Standards
- Action items review & closing

Introductions Status, Time Tracking and Review Action Items

Tami introduced Mark Hotz, who will be the Assistant Project Manager. Mark will be working on Cost Benefit Analysis, Return on Investment, and if the timing works out, will lead an Oregon/Washington Pilot.

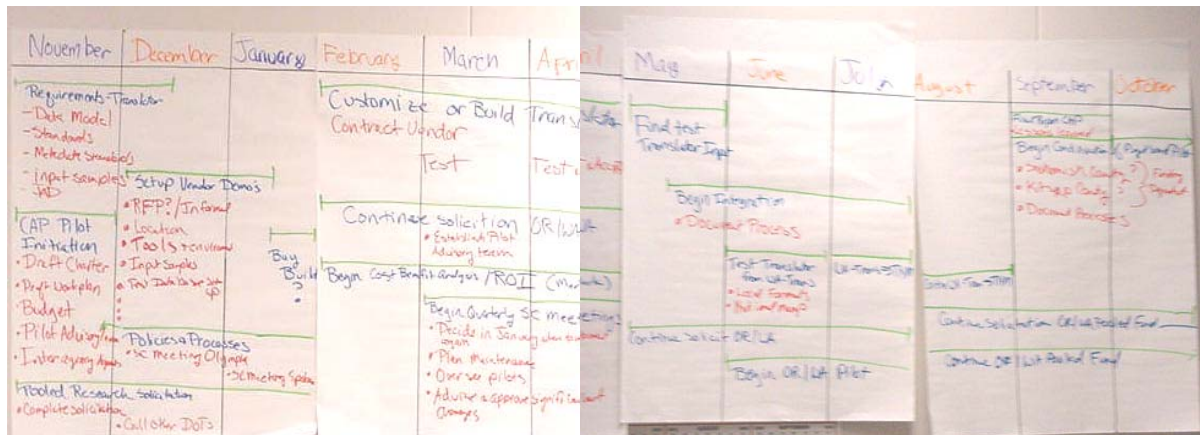
New participants in the Steering Committee include Michelle Blake, who is the WSDOT Geographic Data Administrator and Pat Whittaker who works for the Transportation Data Office, a group that will be a big consumer of WA-Trans data.

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Tami reminded the group that she needs those who participated prior to 2004 to review the time spreadsheet sent out over a month ago to make sure the hours are correct based on your own records and send costs for hourly wage and benefits rolled together if possible, so contributions can be tracked to show commitment and investments made to date.

Schedule Information

Tami laid out a high level schedule of activities from November, 2004 through September, 2005. It was put up on charts, which were photographed. Tami rebuilt them and they can be found in Appendix A of these notes.



Action Item – Tami will develop a more complete schedule.

Metadata Standards

Tami started this section of the meeting asking Ian, as Chair of WAGIC to make sure the WAGIC Basic Metadata Standards and the Working Subset Metadata Standards on the Internet are edited so the colors, which have meaning, will be printable and so the errors and typos are fixed. Ian agreed to do this. Dave Cullom researched the WAGIC Metadata standards, to which all state agencies must adhere, and under which, all statewide datasets are covered. He provided four options. See Appendix B for the options. It was recognized that we can't expect the locals to adhere to these standards and so the translator will have to solicit a lot of metadata from the data providers. The deadline for adherence to both the WAGIC Basic Metadata Standard and the Working Subset Metadata Standard is the end of 2004, thus options III and IV are not really available to us. See Appendix C for the WAGIC Basic Metadata Standard. After going through the Working Subset Metadata Standard of the FGDC/CSDGM there were a few fields that will not be applicable or may be optional. These are:

- Vertical Positional Accuracy – optional
- Raster Object Information – N/A
- Altitude System Definition – Optional (depending on how measurements were taken)
- Depth System Defection – N/A

The Working Subset Metadata Standard is in Appendix D.

Action Item – Ian will work with WAGIC to get the standards published on the Internet in better shape.

Action Item – Dave C. will update the metadata standards based on the input provided today.

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Data Users Front End

The group reviewed the updated document Art provided called "Access for Data User/Downloading Files". There was discussion regarding whether we want to give them an option of downloading metadata. It was decided that this was not a good precedent to set. We still need to give them a disclaimer, but we want them to receive the metadata even if they ignore it.

There was some discussion of platform. We don't want this to be an interactive data service. We want them to identify a geographic extent for clipping, but don't want to provide robust capability beyond that. Appendix E contains the document presented at the meeting.

There is a long-term goal of being able to provide some complex clipping of both data and metadata based on X, Y coordinates. This may require metadata in database format. This is something we don't have time to tackle now.

Action Item – Art will update the document with these decisions for the next meeting.

Data Model Report

Roland reported that we have generally settled core attribution. There has been dialog on attribute domains. We need more clarification regarding relationship of segment object, segment points and segment descriptions. The model is now being maintained at WSDOT in their environment. We are struggling with how to codify business rules. The pilots will feed this. We need a structure for documenting this.

Action Item – Tami will work with data modeling group to identify a structure for business rule documentation and maintenance.

Toolset Description for pooled fund solicitation

Tami updated the group on the solicitation for the pooled fund project with Oregon. There was some feedback on the translator section of the document. In general there was support for pursuing the process. Appendix F contains the toolset description presented at the meeting.

Action Item – Tami will continue to develop the solicitation.

Translator Update

Jerry and Chuck both covered their thoughts regarding the translator and user interface. They are seen by Jerry as being tightly coupled, but it was recognized that they need to be separate for maximum flexibility. It was identified that the translator needs to manipulate the data. The interface protects the translation. It may provide a UML to the local governments. The interface should be separate, but related. We may want to transport the data through another mechanism than the web to be the most efficient. This keeping them separated may be required.

Some added functionality includes: extracting or creating metadata, capturing metadata in FGDC compliant format, making sure that data which have more than one commonly used name are cross referenced (e.g. "Milepost vs. Milepoint). Appendix G contains the translator description presented at the meeting.

Action Item – Jerry will update translator document based on meeting input and send to Chuck

Action Item – Chuck will separate out translator functions from interface functions.

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Policies and Processes

Tami provided the group with a spreadsheet that listed policies to be written and processes to be defined. This is the steering committee's chance to put its "stamp" on how this will operate. Once pilots begin they will define what hasn't been defined by the Steering Committee and the outcome may not be what the committee would desire. We went down the list and assigned most items. The list with assignments is in Appendix H. The action items from this meeting include items from that list. Additional action items related to the list include:

Action Item – Jerry will send Pat the document on Metropolitan Transportation System Classifications

Action Item – Tami will send Pat info on the USGS Classifications.

The rest of the action items relating to this are in Appendix H and on the total action items list.

Traffic Records Strategic Plan and WA-Trans

Chris Madill from the Washington State Patrol attended and shared what the Washington Traffic Records Committee is and how WA-Trans fit in. As Chris shared the committee includes representatives from Department of Licensing who manage data on driver history and vehicle history; law enforcement provides citations, first responders and Department of Health provide injury surveillance systems, WSDOT for roadway feature systems, collisions, etc. The group includes reps from federal, tribal, state, and local governments concerned with these processes. Chris was hired to conduct extensive interviews and figure out how to spend safety money.

They are waiting for the reauthorization of the federal transportation bill (known as SAF-T, previously ICE-T). The president has asked for a significant amount for safety so it is anticipated to be up to a million or more a year for five years to states that have their plans well thought out. There are strict qualification requirements.

The group evaluated the objective for WA-Trans (Objective #4 in current version). Some changes recommended include:

- Change target for task 1 to September, 2005,
- Change "highly populated" to something related to urbanized areas definition, which has some meaning to transportation people,
- Change "secure" to "reliable".

Action Item – Jerry will send Chris information about urbanized areas definition.

Action Item – Chris will update scorecard

The scorecard for WA-Trans (Objective #4) is Appendix I of this document.

Standards

There was significant discussion regarding naming conventions in the data model versus the standards. The standards need to be coordinated with the data model. Some of the more significant discussion revolved around common names for things that aren't shared across levels of government. For instance local governments use the term "milepost" to identify measurements along the road. The WSDOT uses it as an identifier for the location of the actual mile paddles along the road and uses "milepoint" or "accumulated route mile" (ARM) for mile measurements. The data model has to follow WSDOT standards but some concerns were raised regarding the locals using WA-Trans data if the names are not consistent. It was agreed that the translator needed to look for common names for data elements and make those transparent to the user as possible.

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Specific Changes identified include:

- Pg 1 – Rewrite paragraph 1.1 Mission and Goals so “the will” section is removed and it reads more smoothly,
- Pg 2 – Under 2.1 Definitions replace the word “based” with “derived from” in the first paragraph
- Pg 2 – Remove the ROW definition.
- Pg 2 - Change LRS to LLRS for Linear Location Referencing System
- Pg 2 – Change CAD to CADD for Computer Aided Drafting and Design so it isn’t confused with Computer Aided Dispatch used by many partners emergency management.
- Pg 2 – Add GPS.

Action Item – Dave Rideout will use the standards to look for those sorts of issues to assist with the translator requirements.

Action Item – Mark Hotz will be coordinating the standards with the data model and making changes identified. Michelle Blake will assist him.

Draft Standards can be found in Appendix J.

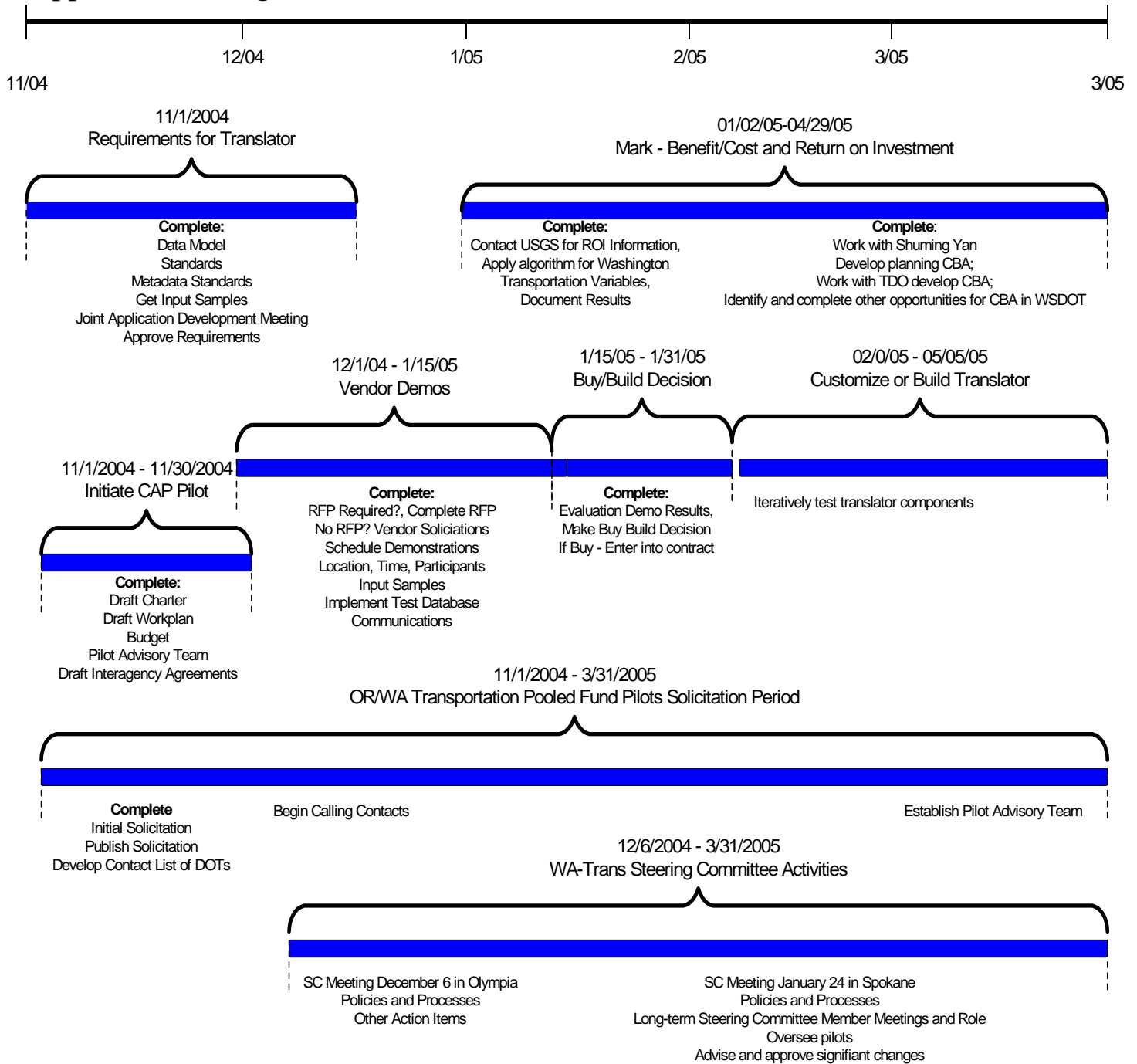
Action items review & closing

The next WA-Trans partner meeting is December 6 from 9 a.m. to noon with video-conferencing upon request at the WSDOT HQ Offices in room 2F22. All steering committee members are strongly encouraged to attend.

WA-Trans Steering Committee Meeting Notes

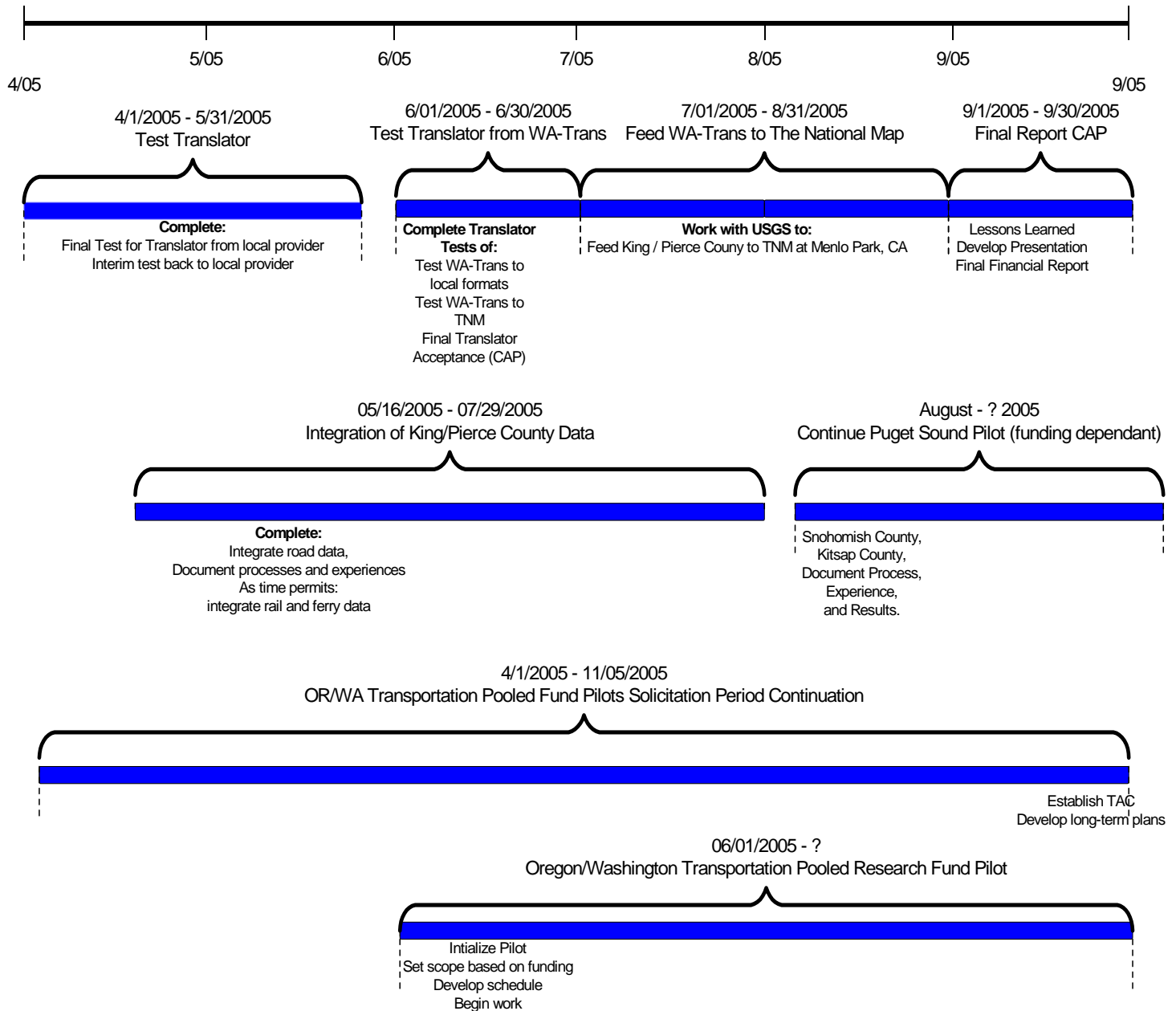
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Appendix A – High Level Work Plan for WA-Trans



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Appendix B – WA-Trans Metadata Standards Policy Draft

WA-TRANS METADATA STANDARDS

Introduction

There are many approaches for documenting geographic data for archival purposes and day-to-day use. Some methods range from informal “Read Me” files discussing spatial reference information, lineage, and process steps to full FGDC metadata with every field being required and filled out. WAGIC established metadata standards for “significant geo-datasets” as defined in the Geographic Information Technology Standards for Metadata. This gives the option of collecting two levels of metadata for an existing or proposed “significant geo-dataset.”

Proposed language to approve:

Option I

It is the policy of WA-TRANS that the completed framework dataset will include metadata that meets the requirements of the Working Subset Metadata Standard of FGDC/CSDGM.

Option II

It is the policy of WA-TRANS that the framework dataset as well as data submissions from supporting partners will include metadata that meets the requirements of the Working Subset Metadata Standard of FGDC/CSDGM.

Option III

It is the policy of WA-TRANS that the completed framework dataset will include metadata that meets the requirements of the WAGIC Basic Metadata Standard.

Option IV

It is the policy of WA-TRANS that the framework dataset as well as data submissions from supporting partners will include metadata that meets the requirements of the WAGIC Basic Metadata Standard.

Background materials:

Geographic Information Technology Standards for Metadata
WAGIC Basic Metadata Standard
Working Subset Metadata Standard of FGDC/CSDGM

Intent:

- Geographic data must be properly documented in order to be stored and retrieved without a loss of information.

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- WA-TRANS is a very significant geo-dataset that requires proper and as complete documentation as possible.

Definitions:

- **Metadata** - "data about data" or "information describing content."
- **WAGIC** - Washington State Geographic Information Council
- **FGDC** - Federal Geographic Data Committee

Detailed research for proposed language:

I. [Geographic Information Technology Standards for Metadata](#)

"To facilitate implementation of this standard the WAGIC Basic and Working subsets of the FGDC Content Standard for Digital Geospatial Metadata are recognized as an approved implementation pathway."

II. [WAGIC Basic Metadata Standard](#)

"This is the minimum required documentation to meet the Geographic Information Technology Standard for metadata."

III. [Working Subset Metadata Standard of FGDC/CSDGM](#)

The Working Subset includes Basic Subset plus following shaded elements."

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Appendix C – WAGIC Basic Metadata Standard

ISB /WAGIC Basic Metadata Subset

of FGDC Content Standard for Digital Geospatial Metadata

Basic Subset - shaded areas indentify actual data entry elements

| | Element Name | Element Definition | FGDC Hierarchy | sgml tag name |
|----|--|--|----------------|---------------|
| | Identification Information | Basic information about the data set. | 1 | idinfo |
| 1 | Title | The name by which the data set is known | 8.4 | title |
| 2 | Publisher | Name of individual or organization that published the data set | 8.8.2 | publish |
| | | | | |
| | Description | A characterization of the data set, including its intended use and limitations. | 1.2 | descript |
| 3 | Abstract | A brief narrative summary of the data set. Domain: free text. | 1.2.1 | abstract |
| 4 | Purpose | A summary of the intentions with which the data set was developed. Domain: free text | 1.2.2 | purpose |
| | Time Period of Content | Time period(s) for which the data set corresponds to the ground. | 1.3 | timeperd |
| | Range of Dates / Times | Means of encoding a range of dates and times. | 9.3 | rngdates |
| 5 | Beginning Date | The first year (and optionally month, or month and day) of the event. Domain: "Unknown" free date | 9.3.1 | begdate |
| 6 | Ending Date | The last year (and optionally month, or month and day) for the event. Domain: "Unknown" "Present" free date | 9.3.3 | enddate |
| 7 | Currentness Reference | The basis on which the time period of content is determined. Domain: "Ground Condition" "Publication Date" free text | 1.3.1 | current |
| | Keywords | Words or phrases summarizing an aspect of the data set. | 1.6 | keywords |
| | Theme | Subjects covered by the data set | 1.6.1 | theme |
| 8 | Theme Keyword | Common-use word or phrase used to describe the subject of the data set. Domain: free text | 1.6.1.2 | themekey |
| | Place | Geographic locations characterized by the data set. | 1.6.2 | place |
| 9 | Place Keyword | The geographic name of a location covered by a data set. Domain: free text | 1.6.2.2 | placekey |
| | Data Quality Information | A general assessment of the quality of the data set. | 2 | dataqual |
| | Lineage | Information about the events, parameters, and source data which constructed the data set, and information about the responsible parties. | 2.5 | lineage |
| 10 | Source Information | List of sources and short discussion of the information contributed by each. | 2.5.1 | srcinfo |
| 11 | Source Time Period of Content | Time period(s) for which the source data set corresponds to the ground. Information about the date and time of an event. | 2.5.1.4 | srctime |
| | Range of Dates / Times | Means of encoding a range of dates and times. | 9.3 | rngdates |
| 12 | Beginning Date | The first year (an optionally month, or month and day) of the event. Domain: "Unknown" free date | 9.3.1 | begdate |
| 13 | Ending Date | The last year (and optionally month, or month and day) for the event. Domain: "Unknown" "Present" free date | 9.3.3 | enddate |
| | Entity and Attribute Information | Information about the information content of the data set, including the entities types, their attributes, and the domains from which attribute values may be assigned. | 5 | eainfo |
| 14 | Overview Description | Summary of, and citation to detailed description of, the information content of the data set. | 5.2 | overview |
| 15 | Entity and Attribute Overview | Detailed Summary of the information contained in a data set. Domain: free text | 5.2.1 | eaover |
| | | | | |
| | Point of Contact / Contact Information | Contact information for an individual or organization that is knowledgeable about the data set. Identity of, and means to communicate with, person(s) and organization(s) associated with the dataset. | 10 | ptcontac |
| 16 | Contact Person | The name of the individual to which the contact type applies. Domain: free text | 10.1.1 | cntper |
| 17 | Contact Organization | The name of the organization to which the contact type applies. Domain: free text | 10.1.2 | cntorg |
| 18 | Contact Position | The title of the individual. Domain: free text | 10.3 | cntpos |
| 19 | Contact Address | The address for the organization or individual. | 10.4 | cntaddr |

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| | | | | |
|----|---------------------------------|--|--------|----------|
| 20 | Address Type | The information provided by the address. Domain: "Mailing Address" "Physical Address" "Mailing and Physical Address" | 10.4.1 | addrtype |
| 21 | Address | An address line for the address. Domain: free text | 10.4.2 | address |
| 22 | City | The city of the address. Domain: free text | 10.4.3 | city |
| 23 | State or Province | The state or province of the address. Domain: free text | 10.4.4 | state |
| 24 | Postal Code | The ZIP or other postal code of the address. Domain: free text | 10.4.5 | postal |
| 25 | Contact Voice Telephone | The telephone number by which individuals can speak to the organization or the individual. Domain: free text | 10.5 | cntvoice |
| 26 | Contact Facsimile Telephone | The telephone number of a facsimile machine of the organization or individual. Domain: free text | 10.7 | cntfax |
| 27 | Contact Electronic Mail Address | The address of the electronic mailboxes of the organization or individual. Domain: free text | 10.8 | cntemail |
| | | | | |

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Appendix D – Working Subset Metadata Standard

Information Service Board Metadata Standard – Appendix A
Approved Working Level Subset of FGDC/CSDGM
February 6th 2003

| <i>Working Subset includes Basic Subset plus following shaded elements</i> | | |
|---|--|-----------------------|
| Element Name | <u>Element Definition</u> | FGDC Hierarchy |
| Status | The state of and maintenance information for the data set. | 1.4 |
| Progress | The state of the data set. Domain: "Complete" "In Work" "Planned" | 1.4.1 |
| Maintenance and Update Frequency | The frequency with which changes and additions are made to the data set after the initial data set is completed. Domain: "Continually" "Daily" "Weekly" "Monthly" "Annually" "Unknown" "As Needed" "Irregular" "None Planned" free text | 1.4.2 |
| Spatial Domain | The geographic areal domain of the data set. | 1.5 |
| Bounding Coordinates | The limits of coverage of a data set expressed by latitude and longitude values in the order western-most, eastern-most, northern-most, and southern-most. For data sets that include a complete band of latitude around the earth, the West Bounding Coordinate | 1.5.1 |
| West Bounding Coordinate | Western-most coordinate of the limit of coverage expressed in longitude. Domain: -180.0 <= West Bounding Coordinate < 180.0 | 1.5.1.1 |
| East Bounding Coordinate | Eastern-most coordinate of the limit of coverage expressed in longitude. Domain: -180.0 <= East Bounding Coordinate < 180.0 | 1.5.1.2 |
| North Bounding Coordinate | Northern-most coordinate of the limit of coverage expressed in latitude. Domain: -90.0 <= North Bounding Coordinate <= 90.0; North Bounding Coordinate >= South Bounding Coordinate | 1.5.1.3 |
| South Bounding Coordinate | Southern-most coordinate of the limit of coverage expressed in latitude. Domain: -90.0 <= South Bounding Coordinate <= 90.0; South Bounding Coordinate <= North Bounding Coordinate | 1.5.1.4 |
| Theme Keyword Thesaurus | Reference to a formally registered thesaurus or a similar authoritative source of theme keywords. Domain: "None" free text | 1.6.1.1 |
| Place Keyword Thesaurus | Reference to a formally registered thesaurus or a similar authoritative source of place keywords. Domain: "None" "Geographic Names Information System" free text | 1.6.2.1 |
| Access Constraints | Restrictions and legal prerequisites for accessing the data set. These include any access constraints applied to assure the protection of privacy or intellectual property, and any special restrictions or limitations on obtaining the data. Domain: "None" | 1.7 |
| Use Constraints | Restrictions and legal prerequisites for using the data set after access is granted. These include any access constraints applied to assure the protection of privacy or intellectual property, and any special restrictions or limitations on obtaining the d | 1.8 |
| | | |
| Attribute Accuracy | An assessment of the accuracy of the identification of entities and assignment of attribute values in a data set. | 2.1 |
| Attribute Accuracy Report | An explanation of the accuracy of the identification of the entities and assignments of values in the data set and a description of the texts used. Domain: free text | 2.1.1 |
| Positional Accuracy | An assessment of the accuracy of the positions of spatial objects. | 2.4 |
| Horizontal Positional Accuracy | An estimate of accuracy of the horizontal positions of the spatial objects. | 2.4.1 |
| Horizontal Positional Accuracy Report | An explanation of the accuracy of the horizontal coordinate measurements and a description of the tests used. Domain: free text | 2.4.1.1 |
| Vertical Positional Accuracy | An estimate of accuracy of the vertical positions in the data set. | 2.4.2 |
| Vertical Positional Accuracy Report | An explanation of the accuracy of the vertical coordinate measurements and a description of the tests used. Domain: free text | 2.4.2.1 |
| Source Scale Denominator | The denominator of the representative fraction on a map (for example, on a 1:24,000-scale map, the Source Scale Denominator is 24,000. Domain: Source Scale | 2.5.1.2 |

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| | | |
|---|--|-------------|
| | Denominator > 1 | |
| Source Contribution | Brief explanation identifying the information contributed by the source to the data set. Domain: free text | 2.5.1.6 |
| | | |
| Spatial Data Organization Information | The mechanism used to represent spatial information in the data set. | 3 |
| Direct Spatial Reference Method | The system of objects used to represent space in the data set. Domain: "Point" "Vector" "Raster" | 3.2 |
| Raster Object Information | The types and numbers of raster spatial objects in the data set. | 3.4 |
| Raster Object Type | Raster spatial objects used to locate zero-, one-, and two-, and three-dimensional locations in the data set. Domain: "Point" "Pixel" "Grid Cell" "Voxel" | 3.4.1 |
| | | |
| Spatial Reference Information | The description of the reference frame for, and the means to encode, coordinates in the data set. | 4 |
| Horizontal Coordinate System Definition | The reference frame or system from which linear or angular quantities are measured and assigned to the position that a point occupies. | 4.1 |
| Planar | The quantities of distances or, or distances and angles, which define the position of a point on a reference plane to which the surface of the Earth has been projected. | 4.1.2 |
| Grid Coordinate System | A plane-rectangular coordinate system usually based on, and mathematically adjusted to, a map projection so that geographic positions can be readily transformed to and from plane coordinates. | 4.1.2.2 |
| Grid Coordinate System Name | Name of the grid coordinate system. Domain: A code table | 4.1.2.2.1 |
| State Plane Coordinate System (SPSC) | A plane-rectangular coordinate system established for each state in the United States by the National Geodetic Survey. | 4.1.2.2.4 |
| SPCS Zone Identifier | Identifier for the SPCS zone. Domain: Four-digit numeric code for the State Plane Coordinate Systems based on the North American Datum of 1983 are found in Department of Commerce, 1986, Representation of geographic point locations for information interchange | 4.1.2.2.4.1 |
| Planar Coordinate Information | Information about coordinate system | 4.1.2.4 |
| Planar Distance Units | Units of measure used for distance | 4.1.2.4.4 |
| Geodetic Model | Parameters for the shape of the Earth. | 4.1.4 |
| Horizontal Datum Name | The identification given to the reference system used for defining the coordinates of points. Domain: "North American Datum of 1927" "North American Datum of 1983" free text | 4.1.4.1 |
| Ellipsoid Name | Identification given to established representations of the Earth's shape. | 4.1.4.2 |
| Semi-major Axis | Radius of the equatorial axis of the ellipsoid | 4.1.4.3 |
| Denominator of Flattening Ratio | The denominator of the ratio of the difference between the equatorial and polar radii of the ellipsoid when numerator is set to 1. | 4.1.4.4 |
| Vertical Coordinate System Definition | The reference frame or system from which vertical distances (altitudes or depths) are measured | 4.2 |
| Altitude System Definition | The reference frame or system from which altitudes (elevations) are measured. The term "altitude" is used instead of the common term "elevation" to conform to the terminology in Federal Information Processing Standards 70-1 and 173 | 4.2.1 |
| Altitude Datum Name | The identification given to the surface taken as the surface of the reference frame from which altitude is measured | 4.2.1.1 |
| Depth System Definition | The reference frame of system from which depths are measured | 4.2.2 |
| Depth Datum Name | The identification given to surface of reference from which depths are measured | 4.2.2.1 |
| Detailed Description | Description of the entities, attributes, attribute values, and related characteristics encoded in the data set. | 5.1 |
| Entity Type | The definition and description of a set into which similar entity instances are classified. | 5.1.1 |
| Entity Type Label | The name of the entity type. Domain: free text | 5.1.1.1 |
| Entity Type Definition | The name of the entity type. Domain: free text | 5.1.1.2 |

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| | | |
|------------------------------------|---|-------------|
| Attribute | A define characteristic of an entity. | 5.1.2 |
| Attribute Label | The name of the attribute. Domain: free text | 5.1.2.1 |
| Attribute Definition | The description of the attribute. Domain: free text | 5.1.2.2 |
| Attribute Domain Value | The valid values that can be assigned for an attribute. | 5.1.2.4 |
| Enumerated Domain | The members of an established set of valid values. | 5.1.2.4.1 |
| Enumerated Domain Value | The name or label of a member of the set. Domain: free text | 5.1.2.4.1.1 |
| Enumerated Domain Value Definition | The description of the value. Domain: free text | 5.1.2.4.1.2 |
| Range Domain | The minimum and maximum values of a continuum of valid values. | 5.1.2.4.2 |
| Range Domain Minimum | The least value that the attribute can be assigned. Domain: free text | 5.1.2.4.2.1 |
| Range Domain Maximum | The greatest value that the attribute can be assigned. Domain: free text | 5.1.2.4.2.2 |
| Codeset Domain | Reference to a standard or list which contains the members of an established set of valid values. | 5.1.2.4.3 |
| Codeset Name | The title of the codeset. Domain: free text | 5.1.2.4.3.1 |
| Codeset Source | The authority for the codeset. Domain: free text | 5.1.2.4.3.2 |
| Attribute Units of Measurement | The standard of measurement for an attribute value. Domain: free text | 5.1.2.5 |
| Attribute Measurement Resolution | The smallest unit increment to which an attribute value is measured. Domain: Attribute Measurement Resolution > 0.0 | 5.1.2.6 |
| | | |
| Citation Information | The recommended reference to be used for the data set. | 8 |
| Originator | The name of organization or individual that developed data set. | 8.1 |
| Publication Date | Date dataset published | 8.2 |
| Title | The recommended name of dataset | 8.4 |

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Appendix E – DRAFT Access for Data User/Downloading Files

General

A web portal will be established to list the agency's core data sets as well as additional supportive layers for background and reference. Mapping functions will be available for both navigation and identification of data sets and layers.

Structure

The website will be composed of the following pages:

- Framework overview
- Web portal page
- Data Sets for Downloading
- Disclaimers/Release of liability to be read before accessing mapping and data sets for downloading
- Resource links for other framework and supporting data layer sets

Viewing

The following data sets are examples of what may be included in the interactive web page. Core Transportation layers and metadata files will be available for distribution through the web portal. A metadata button will appear on the opening statewide view screen. It will give the minimum attributes available and the minimum accuracy standards for the various data in Framework, along with a statement that some data may be available with additional attributes and higher accuracy. (These areas could be color coded for easier identification by the viewer/user. Clicking on an area could bring up that metadata.) The boundaries for these areas are to be determined by the originating agency and can be a representation of their UGA or other determining factor, such as transit district or fire district. Ownership of items in these areas that are not part of the originating agency's inventory will be highlighted to alert the viewer of other agency responsibility. The user will then have the choice to view/download data by boundary or by originating agency within the boundary. When the viewer selects to download data, they will first be given the option to download its corresponding metadata. If the viewer decides to not download the metadata, an alert to the user that WA-Trans is not responsible for incorrect assumptions made about the data resulting from not reviewing the metadata will appear before any download will begin. Transportation Framework will provide links to the originating agency's website for downloading or accessing of data sets belonging to other agencies or entities. Metadata for those data sets would be the responsibility of the provider.

Core Data Sets

1. Federal
2. State Highway system
3. Highway Ramps
4. Mileposts
5. Rest Areas
6. Scenic Highways
7. Local Roads
8. Bridges
9. Railroads

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10. Ferry Transit Routes
11. Aviation Routes
12. Priority Programming
13. Engineering and Maintenance Districts
14. Organization Boundaries

Reference Data Sets

1. County Boundaries
2. Urbanized Areas
3. Reservation boundaries

Additional Data Sets for Download/Access

1. Cris Data (Mobility?)
2. Survey Data

Map functions to be made available:

- Zoom in/out
- Full view
- Pan
- Search by:
 - Location (regional, county or city)
 - Identifiers (street names or intersections)
 - Jurisdictional agency (federal, state or local authority)
 - Urban Growth Area
- Query Data
- Export Data by
 - Selection
 - Data set name
 - All Data Sets shown

Access for Download

Download of the data will be available both through the web map page by selecting the data to be downloaded from the map or through a link to a web page that enables a direct download of the original data set. The second option will be a traditional resource page that lists the data sets available by description, format and location. Downloading complete data sets through a traditional access page in tabular format will provide services for clients that may not have adequate internet access to support access of the interactive web page. These data sets would be available based upon their geographic extents, e.g. by state, county or regionally significant areas.

Formats

Formats to be made available for Download/Access

1. Shape files, ArcGIS feature data sets for ArcSDE, .dxf or .dgn,

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2. .MDB, Excel, DBF, .txt,
3. JPEG, TIFF, bmp or GIF
4. Projection- Washington State Plane South NAD 83 only. (.PRJ files to be provided with shape files)

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Appendix F – DRAFT Pooled Fund Solicitation Tool Description

For state transportation agencies, location is an integral part of most data collected and utilized. When data has a location referencing element (e.g. address, route/milepost) it can be used with a Geographic Information System (GIS) and placed on the roadway or other parts of the transportation system. Much of the useable data about transportation is not maintained at the state DOT level, but at the local level or with other agencies.

For planning, project scoping, environmental management, emergency management and other integral DOT functions there is a significant need to collect and combine this data to create a complete statewide transportation network and associated location referencing systems. The Oregon Department of Transportation (ODOT) and the Washington State Department of Transportation (WSDOT) have begun projects to collect and integrate this data statewide. They have identified several critical software tools, which will facilitate the collection and maintenance of this data. These tools sets could be very useful to other state transportation departments if they are developed with maximum flexibility. The tool set could also be useful beyond developing and maintaining a statewide transportation network for GIS known as a “transportation framework.” In Washington the project is called “WA-Trans”.

This pooled fund solicitation is to attract more states to participate in the development of these tools. The more participants and resources involved, the easier it is to develop maximum flexibility for these tools. A description follows of each proposed tool, how it interacts with the other tools, and the potential data upon which it could operate.

Data to be managed with these tools include includes:

- Roads: location, number of lanes, federal functional classification, address ranges, zip codes, local road identifier, route number, road name(s), location along roadway (milepost), and their geographic representation;
- Railroads: location, type of track (mainline, siding, etc.), train stations location, classification, line identifier, type of crossing, and their geographic representation;
- Ferries: route location, terminal location, route name, federal functional class, staging areas, route length, international or domestic route, average sailing duration, etc.
- Aviation: Airport identifier, surface type. Instrument landing approach, arc code, runway width, use, elevation, FAA Classification, Airport name, terminal location, etc.
- Non-motorized: includes biking, walking, horseback riding, etc. Include location, name, type of usage, etc.
- Ports: location, routes for water transportation (particularly river and Puget Sound)
- Other data as yet not defined.

Translator (Phase I)

Various governmental entities collect and maintain GIS transportation networks to meet their business needs. Local governments frequently collect and maintain highly accurate GIS transportation data in a format that is useful to them. These systems currently require significant manipulation to work with any system state agencies have developed. In order to use this data, the OR/WA pooled fund project proposes development of a translator that will function to convert data from standard GIS and CAD systems used by various governments into a format that is useful to them. Since ODOT and WSDOT are sharing a transportation framework data structure, that is the format they are interested in translating the data into. A flexible translator could translate data into a variety of formats, which could be useful in similar efforts taking GIS vector data with attribution and location referencing from one format into another.

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The proposed translator would be bidirectional. That is, it would format and evaluate data from the data provider to the transportation framework (or other data user). It would then translate data from the transportation framework back to a format and projection or coordinate system to be used by the original data provider. This allows the combined dataset to be used by many governmental entities. The translator would have a friendly user interface that would facilitate setting up the initial data exchange process and store that setup structure so it could be reused in a maintenance mode to facilitate updating the data. The translator would check the data for simple constraints to ensure it met basic requirements as defined by the two parties involved in the exchange.

Data Provider Internet Interface (Phase I)

The data provider Internet interface works with the translator and security system so the organization providing the data has a user interface for providing their data. This interface will allow them to access the translator for setting up the initial translator process, or for changing the process when their data has changed. It will provide feedback on data that is not useable and why. It will allow for regular updates of data based upon arrangements between data providers and data users. In the case of ODOT and WSDOT, it will be the local government providing the data and the transportation framework system. It will interface with the security system to make sure the provider is actually the authorized source for the data provided.

Data User Internet Interface (Phase I)

The data user Internet interface works with the translator and security system so an organization wanting to view or download data that has been translated and integrated into a combined database (transportation framework) can access the data. They will be able to:

- select the geographic region for the data they wish to view/download,
- view the metadata for that selection, Metadata is information about data. In a GIS, metadata is critical because it describes the time when the data was collected (temporal accuracy), the spatial accuracy of the data, the projection and coordinate systems of the data. Because GIS data is placed on the earth's surface, this information is critical when combining data to provide consistency.
- view the actual data for that selection,
- download the data.

The security system will make sure they are authorized to access that data. A disclaimer will be provided regarding the limitation of the data. The translator will be available for formatting the data and projecting it as needed by the data user.

Once they have downloaded the data, they can then put it back with the rest of the GIS transportation data and make use of it like their own data.

Data Integration (Phase I – requirements & feasibility, Phase II – implementation)

The data that ODOT and WSDOT expect to receive from the various agencies will be linear data (representing roads and other transportation modes) with data fields (called attribution) describing characteristics of the roads such as number of lanes, federal functional class, pavement type, etc. The data also includes location referencing information such as addresses, route names, and mileposts. Location referencing data helps “locate” things on specific places along the transportation line. Because the data comes from various sources and each source collects and stores their data differently, it may not “match” at jurisdictional boundaries. For example a road in one county may appear to just end when the same road in another county may appear to just begin when that data is displayed on a map, instead of a continuous line just like the real road. Even within a specific jurisdiction, there are multiple potential providers of road data causing similar problems. Fixing this problem is referred to as “edge matching” or horizontal integration.

There are other types of mismatch. Making sure that the most accurate and complete attribution is correctly attached to the most accurate lines (representing roads, railroads, etc.) is referred to as vertical

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integration. Tools built to facilitate both horizontal and vertical integration will be useful on any linear based GIS data and related attribution, not just for transportation framework.

Quality Assurance and Quality Control (Phase II)

Quality assurance and quality control (QA/QC) are the processes and tools, which establish and enforce data consistency and data accuracy. In an environment where data is being integrated from multiple sources, it is a critical function. Software can be built to enforce QA/QC in the following categories:

- Topological – checks regarding connectivity of the line work at intersections, overpasses and bridges represented as separate features, arcs meeting at jurisdictional boundaries, etc.
- Scale/Spatial – Does the location accuracy meet the planned business use of the data, does the “aesthetic” representation of the transportation feature meet the business requirements?
- Attribute – Are the minimum required fields included, are the field descriptions met, how many of the attributes are populated, are the attribute values valid?
- Metadata – Concerns regarding metadata include: has the required metadata been provided, is it complete, does it conform to established metadata standards; does the metadata match the layer?

All of these are standard GIS requirements for checking data and when the environment is one of handling data from a variety of sources, it is critical that they be supported with software tools to facilitate efficient checking and validation.

Security (Phase II)

Security is necessary at the data provider level to make sure that once agreements are established for the providers of specific data those providers become the official providers and they send data through a secure system. In addition, while it is anticipated that the ODOT and WSDOT are building transportation framework so the data is generally publicly available, it is certain that some business needs (such as statewide E-911 dispatch) require that private data be used in certain situations. Thus, security must be established at the data user side as well. For uses other than transportation framework, it is important that security be available.

Location Referencing Integration (not yet scoped)

When building GIS for transportation infrastructure, a major business need is to be able to locate things along the infrastructure network. Location referencing is how this is done. In Washington State, multiple forms of location referencing are frequently used:

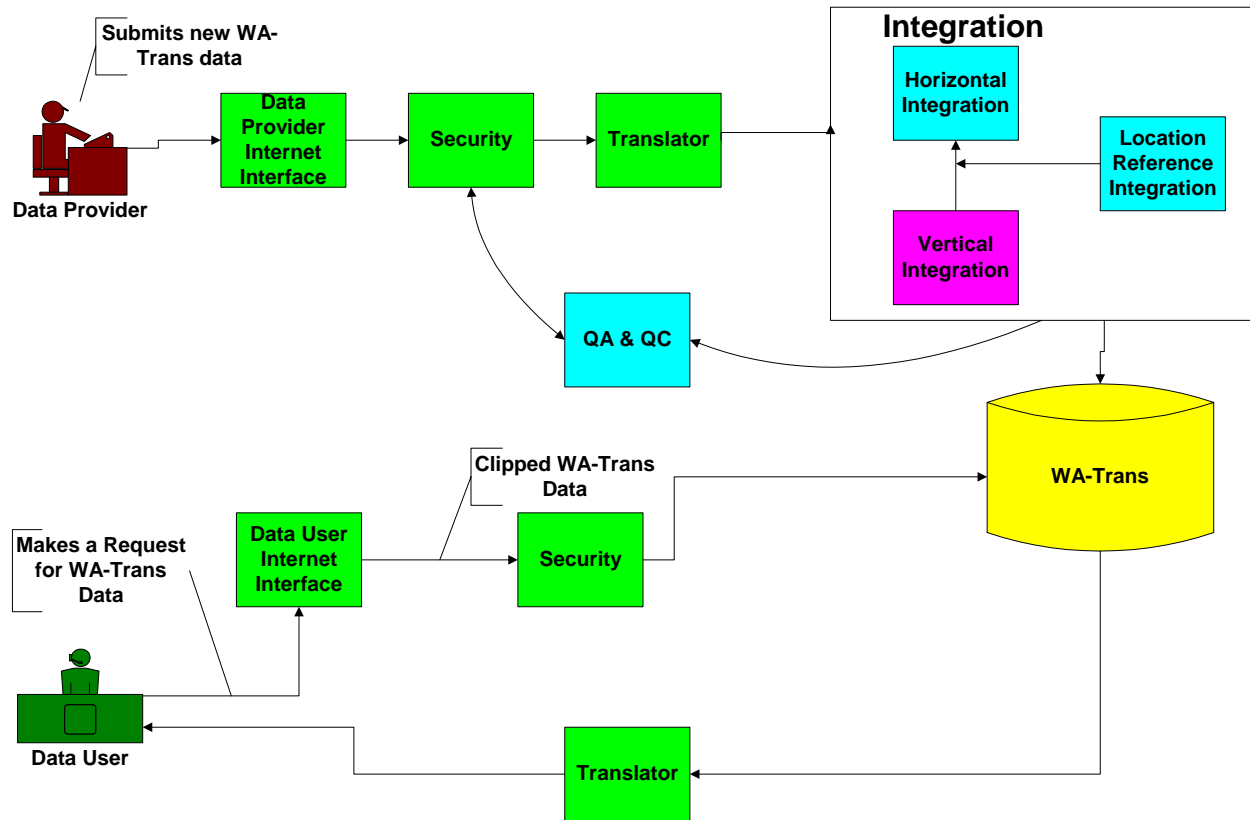
- WSDOT and counties use a form of route/milepost for location referencing,
- Counties and cities use addresses,
- Cities also use distance from intersection
- All use GPS for various purposes.

In order to accurately place things and relate things across location referencing systems it is critical that these systems be integrated between various data providers in transportation framework. This will facilitate geocoding across the state and locating things by a variety of methods, meeting a variety of business needs. Geocoding is the process of using location to retrieve, analyze or map different things based on location. It uses addresses, x, y and other location referencing to place these items. One transportation business need that is supported by geocoding is asset management. Software tools that support location reference integration will be critical when bringing outside data of any sort into any GIS system and then trying to use that data to locate features along a transportation network.

Although local location referencing will be provided with data, it will not include location referencing that is consistent between data providers and across boundaries. In order to have one location referencing system for the whole state it must be applied to the data during integration.

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Appendix G – DRAFT WA-Trans Data Translator

WA-TRANS DATA TRANSLATOR

The basic function of the data translator is to convert local GIS transportation network data from its native format(s) into the WA-TRANS database schema and vice versa. A principle objective is to make the data translation process as simple and labor efficient as possible for the data contributor.

The data translator does not address spatial consistency or “edge matching” issues. That is a separate utility/process. It is a smart filter that converts data formats and schemas.

The data translator is not the user interface or “front end” to WA-TRANS. That is also a separate utility. Obviously the user interface and translator will be connected, but the user interface will need to “talk to” other functions as well.

Requirements:

Essential:

- Accepts local schema as input and outputs WA-TRANS schema.
- Bi-directional (i.e. local to WA-TRANS and WA-TRANS to local).
- Accepts a variety of standard GIS formats (e.g. shapefiles, coverages, etc.) as input.
- Outputs to the same GIS formats.
- Captures and converts spatial data and WA-TRANS core attribution.
- Translation solutions are stored for future use (i.e. the Pierce County to WA-TRANS solution is available for future updates by Pierce County w/out starting over from scratch.)
- Creates metadata (e.g. source, date of translation, etc.)

Useful:

- A wizard interface “reads” local schema and suggests translation.
- Captures and stores local attribution in excess of WA-TRANS core attributes (i.e. extra local data is not lost)
- WA-TRANS data can be extracted in any local format (once a translation solution has been accomplished) for any geography for which WA-TRANS has data. (e.g. Pierce County can download WA-TRANS data for Thurston County in Pierce County’s GIS schema).
- Captures local metadata if available.

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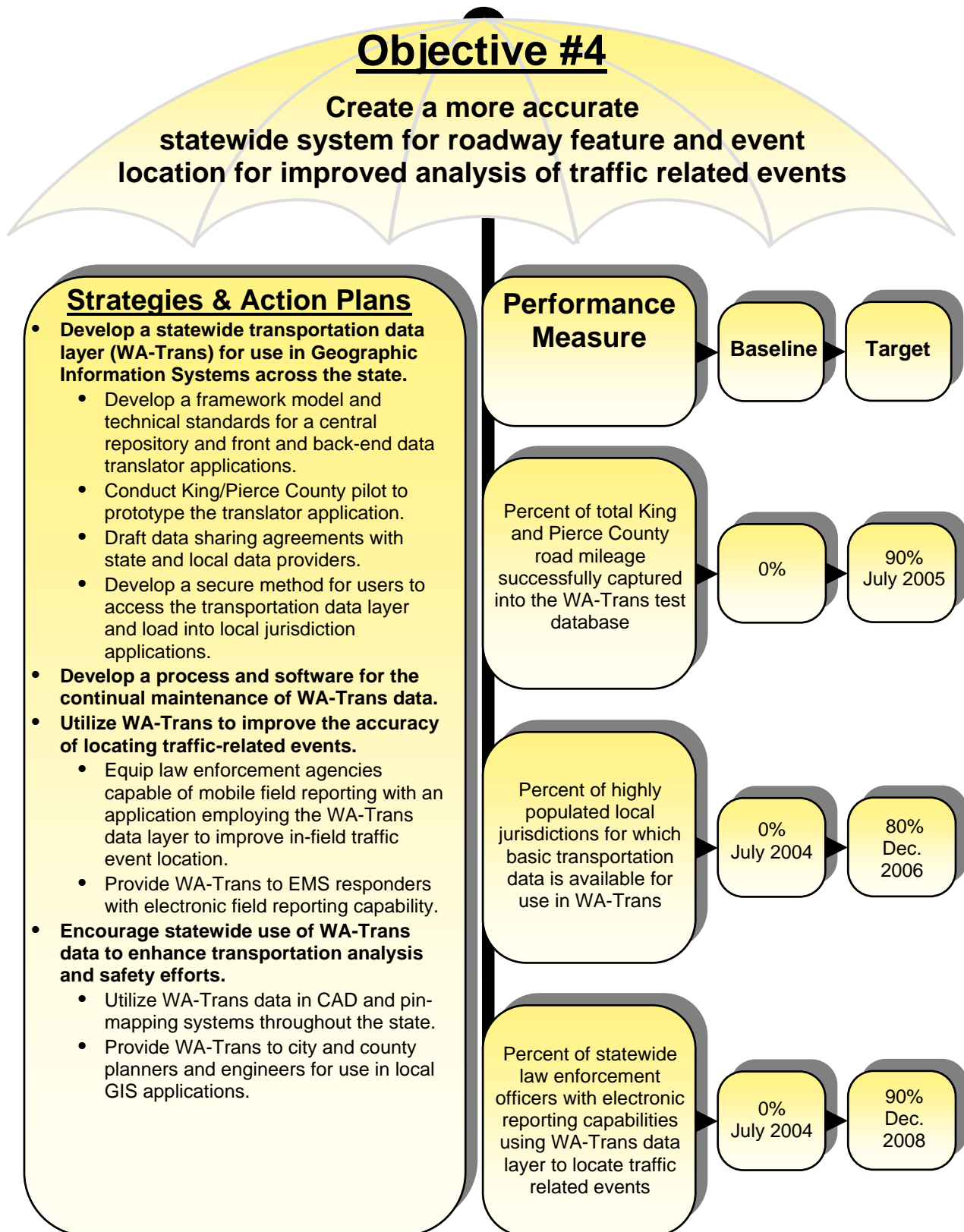
Appendix H – Policies and Processes Spreadsheet

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| Process or Policy to be decided | Category | Type | Status | Responsible Party |
|--|------------------|---------|----------|--|
| Processes for establishing agreement points | Communication | Policy | Complete | Michelle Blake |
| Feedback to data providers, process for correction | Communication | Process | | Chuck Buzzard |
| Strategies for resolving more than one source of data | Integration | Process | | Dave Rideout Dave Rideout, Wendy Hawley |
| Strategies for dealing with no data | Data Stewardship | Policy | | Hawley |
| Process for reconciling segment schemes | | Process | | Chuck Buzzard |
| Cross walk between various road/transportation classification systems | | Process | | Pat Whittaker |
| QA/QC process | | Process | | |
| Process for dealing with scale and accuracy | | Process | | Jerry Harless |
| Public data policy | Data Stewardship | Policy | | Dave Rideout |
| Private data for particular business needs | Data Stewardship | Policy | | |
| Contact through which data should be authorized (County Engineers?) | Data Stewardship | Policy | | Dave Rideout |
| Versioning and access to earlier versions | Maintenance | Process | | Dave Cullom |
| Update cycles | Maintenance | Policy | | Dave Cullom |
| Notification of updates | Maintenance | Process | | Dave Cullom |
| Inventory of gaps in data (including attribution) for prioritization of data acquisition | Maintenance | Process | | Jerry Harless |
| Standards for ramps | Data | Policy | | Tareq, Art, Pat |
| Feedback on WA-Trans software | Maintenance | Process | | |
| Reminder process for updates to data providers | Maintenance | Process | | Dave Cullom |
| change control and change management of WA-Trans | Maintenance | Policy | | |
| Ongoing evaluation of data to feed change process | Maintenance | Process | | |
| Monitoring use and usability | Maintenance | Process | | |

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Appendix I – Traffic Records Scorecard Objective #4



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Appendix J – Draft Standards as of September 7, 2004

WA-Trans Data Standards – Draft

1.0 Introduction

The Washington Statewide Transportation Framework Project (WA-Trans) was organized to create an electronic map of transportation data for use in Geographic Information Systems (GIS) across the state. The WA-Trans partners have delegated the development of the Transportation Framework Data Standards to the WA-Trans steering committee. These standards are comprised of road, rail, transit, water, air, and non-mechanized transportations modes. The data standards will be used as a guideline for data collection during two pilot projects in the Puget Sound and along the Oregon-Washington border. These standards will be adjusted as necessary for as experience is gaining during these pilot projects.

1.1 Mission and Goals of the Data Standards

The WA-Trans Data Standard will enhance the will and ability of partners to collect and maintain the data, match the ability of the partners to collect and maintain data, allow data quality to improve over time for long term data maintenance and updates, and recognize capabilities of existing technology and upgrade with technology improvements.

1.2 Intended use description

The purpose of the WA-Trans Data Standards is to create a set of common requirements for the collection and exchange of information from a variety of spatial and tabular data sources (GIS, CAD, etc.) This information will create a statewide set of data layers developed as a comprehensive transportation network.

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2.0 Scope – Basic Overview of data types, mechanisms

The scope of the WA-Trans Data Standards identifies the modes of transportation data to be collected. It also includes the geographic extent, scale, datum, metadata, linear referencing, feature attributes and data quality. Other relevant information can be found in the WA-Trans Data Model, Architecture and Processes documentation.

2.1 Definitions

Points - A point is a single object with a specific geographic location. Point data can be based on dynamic segmentation of roadways (using mileposts or distance from intersection), x, y coordinates from GPS, or geocoded addressing information.

Lines - A line is a linear feature used to define a shape or represent a contour. A real or imaginary mark positioned in relation to fixed points of reference. Line data can be based on linear dynamic segmentation of roadways.

Event - An event uses tabular information and applies it to one of the available spatially defined transportation modes features to create a point or line feature.

Polygon - A polygon is an area figure having many angles, and consequently many sides; esp., one whose perimeter consists of more than four sides; any figure that creates an area. Polygon data layers will be used as a reference for clipping other data layers.

I expect there will be others as deemed necessary

2.2 Symbols and Abbreviations

| | |
|------|-----------------------------------|
| ROW | Right of Way |
| LRS | Linear Reference System |
| NAD | North American Datum |
| ISB | Information Services Board |
| FGDC | Federal Geographic Data Committee |
| CAD | Computer Aided Drafting |
| GIS | Geographic Information Systems |

Others as deemed necessary

3.0

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Data Characteristics

The following data characteristics outline required attribution for all transportation modes and attribution for specific transportation modes. These requirements are subject to change based on findings during the two pilot projects.

3.1 Required Attribution

3.1.1 Points

| Field Name | Type | Width | Description |
|------------|--------|-------|--------------------------------|
| SHAPE | Point | 9 | Road Point placed by software |
| UNIQUE_ID | Number | 15 | Framework ID from data steward |
| X-COORD | Number | 15 | Longitudinal Coordinate |
| Y-COORD | Number | 15 | Latitudinal Coordinate |
| TYPE | String | ? | Type of point event |

3.1.2 Lines

| Field Name | Type | Width | Description |
|---------------|----------|-------|---|
| SHAPE | Line | 9 | Order of coordinate pairs representing a road segment |
| LENGTH | Number | 16 | Calculated length in US Survey Foot |
| UNIQUE_ID | Number | 15 | Framework topological ID from data steward |
| LOCAL_ID | String? | 9 | |
| MODEFLAG | String | 1 | See Mode Domain below (A, D, F, etc.) |
| RDOWNER | String | 50 | Entity responsible for maintenance of segment |
| RDNAME | String | 72 | Concatenated segment name |
| DIR | String | 3 | Prefix direction (N, S, E, W, etc.) |
| NAME | String | 50 | Road name |
| TYPE | String | 3 | Road type (ex. ST, AVE) component of seg. name |
| SUFF | String | 3 | Suffix direction (N, S, E, W, etc.) |
| ALIASLIST | String | 200? | Alias list separated by ';' Keywords and AKA's |
| FROMLEFT | Number | 10 | Left low address range |
| TOLEFT | Number | 10 | Left high address range |
| FROMRIGHT | Number | 10 | Right low address range |
| TORIGHT | Number | 10 | Right high address range |
| ZONELEFT | String | 16?? | Area descriptor, left side (could be ZIP) |
| ZONERIGHT | String | 16?? | Area descriptor, right side (could be ZIP) |
| FROMMILEPOST | Number | 6 | Beginning Milepost |
| TOMILEPOST | Number | 6 | Ending Milepost |
| LCITY | String | 32 | City on left side of segment |
| RCITY | String | 32 | City on right side of segment |
| COUNTY | Number | 2 | County code for segment |
| FUNCTIONCLASS | Number | 2 | Function Class assigned by RDOWNER/SUBMITTER? |
| PAVEMENTTYPE | String | 1 | Pavement Type assigned by RDOWNER/SUBMITTER? |
| S_DATE_MOD | Date | 8 | Date of last modification to geometry |
| LANES | String/# | 2 | Number of Lanes - 2, 4, 6 multidirectional, two-lane... |
| SPEED | String/# | 8/2 | Speed limit - Number unless multiple speeds posted? |

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3.2 Other Data Fields

These are other data fields that the WA-Trans Steering Committee would like to see included for the end product.

| <i>Field Name</i> | <i>Type</i> | <i>Width</i> | <i>Description</i> |
|-------------------|-------------|--------------|---|
| RDSUBMITTER | String? | 50 | Jurisdiction Submitting Transportation Information |
| JURISDICTION | String | 20 | County, city, State, Feds? (FIPSID) |
| FACILITY NAME | String | 50 | Long name |
| F-NODE | Number | 8 | From node: start point identifier for the road centerline |
| T-NODE | Number | 8 | To Node: end point identifier for the road centerline |

3.3 Other Transportation Modes

3.3.1 Bike/Foot

| <i>Field Name</i> | <i>Type</i> | <i>Width</i> | <i>Description</i> |
|-------------------|-------------|--------------|---|
| MODEFLAG | String | 1 | N |
| WIDTH | Number | 3 | ? |
| PAVEMENTTYPE | String | 1 | Pavement Type assigned by RDOWNER/SUBMITTER? |
| OWNER | String | 50 | Entity responsible for maintenance of segment |

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3.3.2 Railroad

Jeff Schultz of WSDOT Rail Office, Ahmer Nizam and Dave Cullom of the Washington Utilities and Transportation Commission provide this information.

| Attribute | Description | Size | Type |
|----------------------------|---|------|---------------|
| Railroad Name | The Name the "line" or railroad company | 75 | Alphanumeric |
| Operator | Could be the owner, but may not be | 75 | Alphanumeric |
| Line Identifier | To be decided by WSDOT and WUTC. Simplest method that makes sense. | 6 | Alphanumeric |
| USDOT Number | A code for all railroad crossings. | 7 | Alphanumeric |
| Crossing Code | Type of crossing – over, under, at grade, pedestrian | 1 | Alphanumeric |
| From Mile Post | Lower mileage value of segment beginning | 6.2 | Float |
| To Mile Post | Higher mileage value of segment end | 6.2 | Float |
| Public | Railroad feature part of public railroad line? | 1 | Boolean (Y/N) |
| Track Class | Federal designator that indicates various things such as maximum speed allowed. Can be values 0 – 6 | 1 | Numeric |
| Passenger Train Uses Line | Identifies if a regularly scheduled passenger train uses the line. | 1 | Boolean (Y/N) |
| Number of Tracks | Applies both to rail lines and crossings. | 2 | Numeric |
| Type of Railroad segment | This could be part of the mode code. Possible values include: siding, mainline, industrial spur | 1 | Alphanumeric |
| Warning Device at Crossing | Code identifying whether there is sign, or lights or other types of devices. From the Federal Railway Administration Data | 2 | Numeric |
| Train Station | Applies to a node. Indicates there is a train station | 1 | Boolean (Y/N) |
| Train Station Name | The name of the train station. Applies to a node | 15 | Alphanumeric |

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3.3.3 Aviation

John Shambaugh, Aviation Planner at WSDOT, provides this information.

| Attribute | Description | Size | Type |
|-----------------------------|--|------|---------------|
| Airport Identifier | In the US begins with 'K' | 4 | Alphanumeric |
| Surface Type | Code | 3 | Alphanumeric |
| Instrument Landing Approach | Versus visual | 1 | Boolean (Y/N) |
| Arc Code | Size, weight, speed & length of wings from tip to tip (can be used to determine maximum size of aviation vehicle that can land and take off) | 4 | Alphanumeric |
| Width | Expressed as feet | 4 | Numeric |
| Use | This may be covered by mode, includes: apron (parking for planes) taxiway, runway | 8 | Alphanumeric |
| Elevation | Expressed as feet | 6.1 | Numeric |
| FAA Classification | From the NPIAS – National Plan of Integrated Airport Systems | 30 | Alphanumeric |
| State Classification | Washington specific | 10 | Alphanumeric |
| Airport Name | | 100 | Alphanumeric |
| Tower | Is there a tower at the airport? | 1 | Boolean (Y/N) |
| AWAS | Stands for Automated Weather Advisory System. Is there one at the airport? | 1 | Boolean (Y/N) |
| Owner | | 30 | Alphanumeric |
| Terminal | Is there a terminal at the airport? | 1 | Boolean (Y/N) |
| | | | |

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3.3.4 Ferries

Mark Morin and Teri Haffie provide this information.

| Attribute | Description | Size | Type | WA-Trans Name |
|---------------------------|--|------|---------------|---------------------------------------|
| Route Name | Full route name usually includes the cities traveled to or beginning and end cities | 50 | Alphanumeric | Route Name |
| Route Length | Can be either nautical or statute miles) | 3 | Numeric | |
| International or Domestic | Whether the route is domestic only, or international and domestic. Yes if it is only domestic | 1 | Boolean (Y/N) | |
| ? | Private or public ownership | 10? | Alphanumeric | Operator |
| Route Abbreviation | This is the abbreviation of the route name. | 10 | Alphanumeric | Route Identifier |
| Average Sailing Duration | This is the average duration of sail for a particular route. | 4 | Numeric | Crossing Time |
| Terminal Name | This could be an end node for the ferry route, and will likely have a different mode from the ferry route mode. | | | |
| Address1 | This is the terminal street address | 50 | Alphanumeric | Road Name |
| Address2 | This is the terminal street address | 50 | Alphanumeric | |
| City | This is the city the terminal is in | 15 | Alphanumeric | |
| Zip | This is the terminal zip code | 9 | Alphanumeric | |
| County | This the terminal the county is in | 15 | Alphanumeric | |
| Holding space | This is a terminal by terminal based on average vehicle length | 9 | | Number of lanes |
| ? | Not sure | | | System wide restrictions |
| ? | This would be terminal based | | | Load restrictions attached to routes |
| ? | This would be terminal based | | | Length restrictions attached to route |
| ? | This is the transportation mode type, and there would probably be two for ferries, one for the terminal and one for the route. | | | Mode Carrying Flag |
| ? | | | | To Milepost |
| ? | | | | From Milepost |
| ? | | | | GPS for routes |

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3.4 Misc Notes (Probably not going to have this in final draft)

Does there need to be a data dictionary that would go into more detail of each attribute in the tables above? Oregon Road Centerline Data Standard Folks have added this information...

There was some discussion regarding functional class. What is the relationship between functional class (Federal Highway Administration's road classifications) and Census CFC's based upon USGS Road classifications 1 –7 from trail to highway. We need to create a crosswalk for them. This may be part of the standards definition.

USGS Code – Federal, State, Paved, etc.

FHWA includes codes for different road types – e.g. 7 – 9: Rural codes; 13, 14, 15, 16, 17, 19 – Urban Codes from collector to major urban arterial.

Ramps – See notations from April meeting on WSDOT ramp system. More research is being done to see how other organizations handle classifying their ramps.
May need an alias name here to use a connector between state and local agency ramp codes.

Data reference points on the boundary layers where jurisdictions cross. Pseudo-nodes with jurisdictional ID.

Mode code domain:

A = automobile & general traffic
B = bus only (as in the bus only freeway on/off ramps)
F = ferry (auto)
H = high occupancy vehicle (bus or carpool)
L = light rail
M = monorail
N = non-motorized
P = passenger only ferry
R = heavy rail
V = aviation (runway)

Others as deemed necessary

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4.0 Data Content

4.1 Rules for submission – See processed QA/QC

- Best available datasets must be topologically clean when in GIS format
- Line features should be contiguous across coverage boundaries (i.e. where a single geographic feature is split into adjacent coverages or tiles, it should be edge-matched).
- Every feature (point, line, etc) should have one attribute record.
- Each submitted data layer needs to have complete attributes as designated by the core attributes documentation above.
- Frequency updates will be established and a reminder will be set based data stewards previous submissions
- Must only submit data of which you are steward (facility owner)
- All data will have metadata that will need to be signed off on with data submission.

More information in this area although some of this will be handled when setting up the translator.

4.2 Data Standards

Translator will be used to bring all data to this level and outputs to the level needed by the data requestor.

Sample Data Set Standards

| | |
|-----------------------|---|
| Horizontal Datum: | NAD 83/91 |
| Vertical Datum: | NGVD 88 |
| Projection System: | Lambert Conic Conformal |
| Coordinate System: | WA State Plane Coordinates |
| Coordinate Zone: | South |
| Coordinate Units: | Feet or meters if NAD83/91 |
| Accuracy Standard: | replace with target table |
| Vector Import Format: | .shp, .dgn, .dxf, .dwg, .mdb |
| Database format: | .MDB (geodatabase), excel, .DBF, or .txt (.CVS?), XML, .mls, .xls |
| Metadata: | ISB required and optional |

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4.3 Metadata Standards

4.3.1 *Basic List - Required*

Basic information about the data set

Title, Publisher

Description

Abstract, Purpose

Time Period of Content

Range of Dates / Times

Beginning Date, Ending Date, Currentness Reference

Keywords

Theme

Theme Keyword

Place

Place Keyword

Data Quality Information

Lineage

Source Information, Source Time Period of Content

Range of Dates / Times

Beginning Date, Ending Date

Entity and Attribute Information

Overview Description, Entity and Attribute Overview

Point of Contact / Contact Information

Contact Person, Contact Organization, Contact Position, Contact Address

Address Type, Address, City, State or Province, Postal Code

Contact Voice Telephone, Contact Facsimile Telephone, Contact Electronic Mail

Address

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4.3.2 Working Subset - Required

- Status – Maintenance information for the data set
 - Progress – Complete, in progress, or planned
 - Frequency of updates
- Spatial Domain – geographic domain of dataset
- Bounding Coordinates
 - West, North, East, South
 - Theme, and Place Keywords
 - Access and Use Constraints
- Attribute Accuracy
 - Attribute Accuracy Report – explains the accuracy of the features
 - Positional Accuracy – Estimate of horizontal accuracy of spatial objects
- Vertical Position Accuracy
 - Vertical Positional Accuracy Report – Vertical accuracy
 - Source Scale
 - Source Contribution – info on contribution dataset
- Spatial Data Organization Information
 - Direct Spatial Reference Method
- Raster Object Information
 - Raster Object Type
- Spatial Reference Information
- Horizontal Coordinate System Definition
 - Planar
 - Grid Coordinate System (name)
- State Plane Coordinate System
 - SPSC Zone Identifier
- Planar Coordinate Information
 - Distance Units
- Geodetic Model
 - Horizontal Datum Name
 - Ellipsoid Name
 - Semi-major Axis
 - Denominator of flattening ratio
- Vertical Coordinate System Definition
- Altitude System Definition
 - Altitude Datum Name
 - Depth System Definition
 - Depth Datum Name
- Detail Description
 - Entity Type
 - Entity label
 - Entity definition
 - Attribute
 - Attribute Label
 - Attribute definition
 - Attribute Domain Value
 - Enumerated Domain
 - Enumerated Domain value
 - Enumerated Domain definition
 - Range Domain
 - Range Domain Max
 - Range Domain Min
 - Code set Domain
 - Codeset Name
 - Codeset Source
 - Attribute Units of Measurement
 - Attribute Measurement resolution
- Citation Information

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Originator, Publication Date, Title

4.3.3 Recommended Subset

Citation

- Supplemental Information
- Temporal
- Temporal Keyword
- Temporal Keyword Thesaurus
- Temporal Keyword
- Data Set Credit
- Security Information
- Security Classification System
- Security Classification
- Security Handling Description
- Attribute Accuracy Value
- Attribute Accuracy Explanation

Completeness report

- Horizontal Positional Accuracy Value
- Horizontal Positional Accuracy Explanation
- Source Citation
- Map Projection
- Map Projection Name
- Individual Map Projection Descriptions (See FGDC Outline)
- Entity and Attribute Detail Citation

Distribution Information

Distributor

Distribution Liability

Standard Order Process

Digital Transfer Options

- Online Options
- Computer contact Information
- Network Address
- Network Resource Name
- Dialup Instructions
- Access Instructions

Technical Prerequisites

Metadata Reference Information

- Metadata Data
- Metadata Contact
- Publication Information
- Publication Place
- Contact Person Primary
- Contact Organization Primary
- Hours of Service
- Contact Instructions

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5 Data Quality

Data Scale

This will be a multi-scale dataset

1:1200, 1:6000, 1:24000 Urban
1:6,000, 1:24,000, 1:48,000 Rural
1:24,000, 1:48,000, 1:100,000 Remote

Data Accuracy

| | Urban | | | Rural | | | Remote (ag/forestry) | | |
|-------------------------------|--------------|------------|------------|--------------|------------|------------|-----------------------------|------------|------------|
| | <i>High</i> | <i>Med</i> | <i>Low</i> | <i>High</i> | <i>Med</i> | <i>Low</i> | <i>High</i> | <i>Med</i> | <i>Low</i> |
| Spatial Accuracy | 1 ft. | 5 ft. | 40 ft | 5 ft | 40 ft | 50 ft | 40 ft. | 50 ft. | 100 ft |
| Update Frequency | 1 mos. | 6 mos. | 1 yr. | 1 yr. | 2 yrs. | 3 yrs. | 1 yr. | 2 yrs. | 5 yrs. |
| Attribute Completeness | 95% | 80% | 70% | 95% | 80% | 70% | N/A | N/A | N/A |
| Source Scale | 1:1200 | 1:6000 | 1:24 K | 1:6000 | 1:24 K | 1:48 K | 1:24K | 1:48K | 1:100K |

Stewardship

Update Cycles

- Need decisions on best available data for each data layer and/or scale.
- Here data could be submitted to source agency when concatenating with tabular or spatial data. If this is acceptable this would reduce the need to concatenate data repeatedly with each update cycle.
- Also will need to define a regular update cycle for data. Many agencies have an annual update cycle based on budget cycle. Would this dictate framework update cycle? Yearly updates, quarterly?

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Data Layers

7.1 Core Data Sets:

State Highway

Highway Ramps – WSDOT naming convention

Milepost

Scenic Roads - attribute

Local Roads

Tribal Road Designators

Non-Motorized Transportation Modes

Railroads

Port Facilities

Ferry Transit Routes – include ferry terminal locations, includes staging areas as segments and connector roads

Aviation – includes airport locations, connector roads and runway segments

7.2 Reference (Boundary) Datasets:

County Boundaries

Reservation Boundaries

City boundaries – too dynamic?

7.3 Supporting Datasets:

CRIS Data – Core attribution

Survey Data – Core attribution

Bridges, culverts – attribute (event), eventually BEarms for bridge

7.4 Interfaces

Mobility

Geospatial One-stop

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References

This standard was ...

All Roads (HARP), ODT, Watterson and Brady, 2003 v5 draft
ANSIT, Geographic Information Framework-Data Content Standards for
Transportation Networks: Roads
Oregon Road Centerline Standard, ODT, V.2, 2003 draft
Michigan Framework – web
http://www.michigan.gov/cgi/0,1607,7-158-12759_14194---,00.html
Arizona Framework – web
Dueker white paper
King Co Standards
http://www.metrogis.org/data/standards/address_guidelines.shtml
Minnesota Data Standards
<http://www.co.clay.mn.us/Depts/GIS/GISDStan.htm>
[1] WAGIC Metadata
http://wagic.wa.gov/techstds2/wl_subsetv1.htm
Geospatial One Stop
<http://www.geo-one-stop.gov/Standards/Base/index.html>

These will need to be cited as necessary

Action Items

| What | Who | When | Status |
|--|---------------------------|-------------------|----------|
| Work with WAGI C to get the standards published on the Internet in better shape. | I an | ASAP | Assigned |
| Update the Metadata Standards based on input provided at meeting | Dave C. | November 5, 2004 | Assigned |
| Update End User/Download document based on meeting feedback | Art | November 29, 2004 | Assigned |
| Work with data modeling group to identify a structure for business rules documentation and maintenance | Tami | ASAP | Assigned |
| Develop Pooled Fund Solicitation | Tami | November 5, 2004 | Assigned |
| Update translator document based on meeting input and send to Chuck | Jerry | November 5, 2004 | Assigned |
| Separate out translator functions from interface functions in translator document and send to Tami/Bfirst | Chuck | November 10, 2004 | Assigned |
| Send Pat document on Metropolitan Transportation Systems Classifications | Jerry | November 12, 2004 | Assigned |
| Send Pat info on USGS Classifications | Tami | November 5, 2004 | Assigned |
| Send Chris information about urbanized areas definition | Jerry | November 5, 2004 | Assigned |
| Update Scorecard | Chris | ? | Assigned |
| Coordinating standards with Data model | Mark Hotz, Michelle Blake | November 12, 2004 | Assigned |
| Take updated standards and identify naming issues between state and local agencies so the translator and look for them | Dave Rideout | November 24, 2004 | Assigned |
| Develop draft process for a cross walk between various road/transportation classification systems | Pat | November 29, 2004 | Assigned |

Note: *Italicized items are prior to current meeting but are still outstanding unless otherwise stated. Colored items are critical to other things being completed and should be looked at as high priority.*

Meeting Date: 10/25/2004

| What | Who | When | Status |
|--|---------------------------------|-------------------------|--------------------|
| Develop standards for ramps | Tareq, Pat, Art | November 29, 2004 | Assigned |
| Develop draft process for dealing with scale and accuracy | Jerry | November 29, 2004 | Assigned |
| Develop draft process for inventory of gaps in data (including attribution) for prioritization of data acquisition | Jerry | January 17, 2005 | Assigned |
| Develop draft processes and policy for establishing agreement points | Michelle | January 17, 2005 | Assigned |
| Develop draft process for providing feedback to data providers and correction of data | Chuck | January 17, 2005 | Assigned |
| Develop draft process for reconciling segment schemes | Chuck | January 17, 2005 | Assigned |
| Develop draft policies to support Strategies for resolving more than one source of data | Dave R. | January 17, 2005 | Assigned |
| Develop draft policies regarding contact through which data should be authorized | Dave R. | January 17, 2005 | Assigned |
| Develop draft strategies for dealing with jurisdictions with no data. | Dave R., Wendy | November 29, 2004 | Assigned |
| Develop draft policies and processes for handling versioning and access to earlier versions of WA-Trans | Dave C. | November 29, 2004 | Assigned |
| Develop draft policies and processes for establishing and maintaining update cycles and notification of updates for WA-Trans | Dave C. | November 29, 2004 | Assigned |
| Develop draft policies and processes for a reminder process for updates to data providers | Dave C. | January 17, 2005 | Assigned |
| <i>Update time tracking spreadsheet with salary/benefit information.</i> | <i>All SC Members</i> | <i>November 1, 2004</i> | <i>In progress</i> |
| <i>Update time tracking spreadsheet with accurate hours (as much as possible)</i> | <i>SC Members prior to 2004</i> | <i>November 1, 2004</i> | <i>In progress</i> |

Note: *Italicized items are prior to current meeting but are still outstanding unless otherwise stated. Colored items are critical to other things being completed and should be looked at as high priority.*

Meeting Date: 10/25/2004

| What | Who | When | Status |
|--|--------------------------------------|--|--|
| <i>Investigate adding a bike path field to roads core attribution</i> | <i>Dave R.</i> | <i>August 6</i> | <i>Assigned</i> |
| <i>Check with WSDOT Pedestrian and bike people about data</i> | <i>Tami</i> | <i>August 23</i> | <i>Assigned</i> |
| <i>Check into WA Bicycle Alliance with non-motorized staff person at PSRC</i> | <i>Jerry</i> | <i>August 27</i> | <i>Assigned</i> |
| <i>Work with Bfirst Systems Inc. to develop detailed requirements for the translator</i> | <i>Jerry, Chuck, Tami</i> | <i>When scheduled</i> | <i>In Progress (Nov. 16)</i> |
| <i>Go through all WA-Trans notes and document things that are the basis or ideas regarding processes and policies for WA-Trans</i> | <i>Tami</i> | <i>October 15</i> | <i>In Progress</i> |
| <i>Work to identify changes for data model</i> | <i>Roland, Jerry, Dave R., Tareq</i> | <i>September 7</i> | <i>In Process</i> |
| <i>Write letters supporting WA-Trans and funding of WA-Trans on letterhead of their organizations (Looking for letters regarding emergency management from emergency operations specifically right now.)</i> | <i>All SC Members</i> | <i>ASAP!!! – February 6 would be best!</i> | <i>PSRC, Community Transit, WUTC, Pierce County are complete</i> |
| <i>Meet with the WSDOT assistant Attorney General to discuss this issue and get guidance on what our options are.</i> | <i>Tami</i> | <i>When completed with Tier 2 description and issues</i> | <i>Assigned</i> |
| <i>Provide results from CRAB survey to WA-Trans.</i> | <i>Dan</i> | <i>When completed</i> | <i>In Process</i> |
| <i>Work with Nick Marquardt, PSRC, and TNM to develop scope of pilot project.</i> | <i>Tami, Jerry</i> | <i>ASAP</i> | <i>In process</i> |

Note: *Italicized items are prior to current meeting but are still outstanding unless otherwise stated. Colored items are critical to other things being completed and should be looked at as high priority.*

Meeting Date: 10/25/2004

Tami's Status Report Steering Committee Meeting; October 25, 2004

Things are suddenly moving at a rapid pace! It is going to require that we all keep working on moving this forward as much as possible!

First the best news! WA-Trans was awarded the USGS NSDI CAP Grant. It is for \$75,000. We wouldn't have been successful without the commitment of Jerry Harless and Puget Sound Regional Council; Linda Gurell, Chuck Buzzard and Pierce County GIS; King County Metro and Mike Berman; and Vicki Lukas, Sam Bardelson and the USGS NW Geographic Science Team! Additionally I need to thank Dave Rideout and Ian Von Essen for information about the National Map Pilot they worked with the USGS on and George Spencer who spent so much time editing my work and making sure we got registered on Grants.gov! So now the work begins. Sam and I traveled to Denver in late September where all of the recipients of this years' CAP awards met with the USGS and found out how things work. There are a couple of similar projects to ours, but none is exactly like ours. I will be working hard to get a project plan and other project initiation deliverables done in early November.

As far as the Microsoft Grant, with Bfirst Solutions Inc. is concerned, it may be rescinded. I am fighting for it but Microsoft is changing directions. I will have a report for you at the meeting. I hope to get it resolved this week. Either way Chuck and Jerry will be working with me and someone else to provide detailed requirements for the translator with in the next month.

The pooled fund project with Oregon is starting to really take shape. We have decided to solicit through the National Pooled Fund website and with GIS and Transportation Data Offices throughout the nation in Departments of Transportation. They then will work through their research offices to contribute and join. We will be asking for around \$20,000 per agency for each year to participate in the building these tools, in exchange for getting the tools and source code when the work is done. We will take less as well, but to be on the steering committee requires the higher-level contribution. This has been successful for other software development research projects. We will also be soliciting personally to these offices. Both Oregon and Washington have already committed \$30,000 so we can start with \$60,000 while we are soliciting. It can take up to year once the solicitation begins to get enough participants to do a lot, but meanwhile you can work with what you have.

I have been working with the WSDOT Office of Information Technology to begin setting up WA-Trans as an official project, get the database design accepted

and ready to be implemented in a test environment and to design the infrastructure required for WA-Trans. It appears that we may have some good fortune in our relationship with the Trip Planner project. They seem to have some good grant money coming in and may have a federal earmark. They are willing to share their infrastructure with us and it appears they need the same things! So their project manager (Robin Phillips, WSDOT Public Transportation Office) has agreed that we should work on it together and what they buy we can use!

I have worked with Pierce County to get a copy of the applications they have built for us and I am working on getting them set up and available to me.

I gave a presentation at the WSDOT NW Region Brownbag Seminar on GIS organized by Tareq and Art. They did a fantastic job! Linda Gurell also presented. It was very good and I think, helpful for WA-Trans. Tariq had some managers there. That always helps our visibility.

I am in the process of hiring an Assistant Project Manager. I did interviews last week and should be able to let you know the results at the meeting. This position is funded through June 2005, but obviously, I am hoping we can figure out a way to fund it further.

I will be attending the National URISA Conference in November at Reno, NV. I hope to be able to find more DOTs GIS contacts for the pooled fund project there.

We have some new members of the steering committee. First, I asked Jason Guthrie of Lincoln County to replace Joe Bowles. Thankfully, he agreed and will be attending from Spokane. I have also asked Michelle Blake, the WSDOT GIS Data Steward to join us as we move toward implementing something. Michelle understands the WSDOT environment and can be very helpful. Since what we are doing is closely linked with Federal Functional Classification and the Transportation Data Office is expecting to be a primary user in WSDOT of WA-Trans Pat Whittaker has agreed to join us representing that office.

We also have two new partners. They are Whatcom County Public Works and Love GIS Consulting.

Our next meeting is December 6 from 9 a.m. to 2 p.m. in Olympia at the Transportation Building on Maple Park in room 2F22 (Shamen room). Video-conferencing will be available.

WA-Trans Steering Committee Meeting Notes

July 19, 2004

Attendees:

| Member | Association | Representing |
|--------------------|--|---|
| Tareq Al-Zeer | WSDOT | WSDOT |
| Roland Behee | Community Transit | Transit Organizations |
| Sam Bardelson | US Geological Survey Washington Liaison | The National Map |
| Dave Cullom | Washington Utilities and Transportation Commission | Pipelines, Utilities, Railroad |
| Jerry Harless | Puget Sound Regional Council | MPO's, RTPO's |
| Tami Griffin | WSDOT Geographic Services | WA-Trans (Project Manager), Facilitator |
| Wendy Hawley | Census Bureau | US Bureau of Census |
| Dave Rideout | Spokane County Engineers Office | Spokane County |
| Art Shaffer | WSDOT NW Region Maintenance & Ops | Alternate WSDOT |
| George Spencer | WSDOT | WAGIC, WSDOT |
| Elizabeth Stratton | WSDOT | Freight Interests |
| Ian Von Essen | Spokane County GIS | E-911 |

Not Attending:

| Member | Association | Representing |
|------------------|--|----------------------------|
| Chuck Buzzard | Pierce County GIS | West side local government |
| Dan Dickson | CRAB | CRAB |
| Tony Hartrich | Quinault Indian Nation | Quinault Indian Nation |
| Dave Wolfer | WA Department of Natural Resources | WADNR |
| Terry Strandberg | Tulalip Tribes Community Planning Office | The Tulalip Tribes |

- Introductions, Status Questions, Time Tracking, Action Item Review
- Core Attribution Update - Roads
- Core Attribution - Ferries
- Core Attribution - Aviation
- Core Attribution - Railroad
- Core Attribution – Non-motorized
- Review Data Providers Front-End Specifications
- Policies and Processes
- Traffic Records Strategies and Performance Measures
- ~~Metadata Standards Comparison~~
- Action items review & closing

Introductions Status, Time Tracking and Review Action Items

Tami announced that Joe Bowles has resigned his job and will no longer be participating on the WA-Trans Steering Committee. Tami will be looking for a replacement participant so we have someone from a rural county. Since Joe had an action item to finish up the Data User Front-end Art volunteered to complete that action item.

Tami introduced Elizabeth Stratton, who works for the WSDOT Freight Policy and Strategy Office. Elizabeth will be the new freight representative. At the next meeting Tami will introduce Elizabeth more fully.

After going through the action items it was discovered that no one had looked at the metadata spreadsheet Wendy built. That agenda item will be carried forward. Please don't forget!!

Wendy Hawley reported that the Bureau of Census has no tools for metadata at this time.

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Core Attribution Update - Roads

Dave Rideout did update the roads core attribution. He will send out an update within a few days of the meeting. Here is what he recommended adding:

- Road Submitter – the submitter of the data (not always the owner or road authority)
- Mode flag – intrinsic to the data model
- Facility Name
- Unique Id – part of the data model
- Local Id – part of the data model
- Number of Lanes – discussed at previous meetings
- Speed Limit – discussed at previous meetings
- Jurisdiction

It was agreed that the Road Core Attribution is considered done for now. See Appendix A for the version of Road Core Attributes from the previous meeting.

Action Item – Dave will send out updated Road Core Attribution.

Core Attribution - Ferries

Tami and Jerry met with Washington State Ferries people in the Terminal Engineering Office. They provided a list of potential attributes for Ferries. Things considered when building the list were that this would not create a ferries GIS but would be useful to non-ferries people looking at multi-modal applications. Additionally, decisions about what to include were limited to those things that were semi-permanent such as terminals, docks and routes and not based on vessels. Vessels can change.

Tami provided the list to Shawn, who contacted WSF Information Technology staff. Shawn spoke with someone familiar with the AOSS System. They provided the IT names, descriptions other details that Shawn used to build a spreadsheet to hold that information. This will be Appendix B of these notes.

The feedback included:

1. Add an operator field. Some of the boats are privately owned or county owned and others are WSDOT operated, not WSF.
2. Remove the “ferries schedule” field. The original goal was to identify times when a route was not available. We don’t really want to carry something that changes like a ferry route.
3. Remove latitude and longitude. Those are implicit in WA-Trans.
4. A question – is holding space expressed as the number of vehicles?
5. There was uncertainty regarding load restriction and length restrictions. More research needs to be done on whether this data exists and whether we should have it.

Action Items – Shawn will update this spreadsheet and standards and maybe do some more research into other WSF systems to see if there are restrictions attached to terminals or routes that are not vessel dependant.

Core Attribution - Aviation

Roland and Tami met with John Shambaugh of the WSDOT Aviation Division. Roland reported they are in the process of updating and developing new systems and databases and identifying how their processes will work to maintain them. They have had most of the end points of runways surveyed statewide and these can be used to identify the runway location in WA-Trans. There are CAD drawings of most airports. This is mostly plane metric data. They have codes for identifying taxiways and entrances to hangers. These things might be absorbed in the mode code. They do not have military airport

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information. Only minor changes were noted for the description of the core attribution for aviation. Appendix C contains the draft core attribution for aviation.

Core Attribution - Railroad

Tami and Dave Cullom attended this meeting with Ahmer Nizam of the WA Utilities and Transportation Commission and Jeff Schultz of the WSDOT Rail Office. Tami found out from Dennis Schofield of ODOT that the Federal Railway Administration (FRA) is collecting GPS data about each line. This data can be used for rails. WSDOT has a crossing database. WUTC also has a crossing database. There were some questions about agreement points between rails and roads. There was also concern that we need agreement points between roads and ferries as well. The data provided was accepted as is. There is one field for "line identifier" that Jeff and Ahmer will discuss and provide us with more detail later. Appendix D contains the draft core attribution for aviation.

Action Item – Tami and Dave follow up with Rick and Ahmer regarding "line identifier".

Core Attribution – Non-motorized

Jerry identified information about non-motorized. It was decided to refer to bikes, foot, horses, etc. as a non-motorized mode. The standard needs to be changed accordingly. Jerry identified that there is very limited information available. Communities build trails. Roland identified that Community Transit is now custodian for non-motorized data for Snohomish County. He also suggested looking at the Washington Bicycle Alliance. They are involved in efforts regarding statewide routes of regional significance to identify non-motorized corridors statewide. They are doing an inventory. Some of it is on existing roads. It is integrated with traffic. We could add a bike lane to the roads layer. There is a website on it called Cascade.org which identified regional routes programs. We will have to figure out the best way to use mode-code for this. Appendix E contains the core attribution for non-motorized.

Action Item – Dave investigate adding a bike path field to the roads core attribution.

Action Item – Tami check with WSDOT Pedestrian and bike people about data.

Action Item – Jerry will check into the WA Bicycle Alliance with the non-motorized staff person at PSRC.

Review Data Providers Front-End Specifications

Chuck was not at the meeting to present his draft specification for a data submission interface. Tami presented it along with an e-mail Chuck sent her discussion some questions and concerns. There were several concerns with the proposal. It appears that it negates some of the functioning planned for translator. This kind of discussion is productive because it shows how different people have different visions of how software works and still think they want the same thing. The concerns were:

- It appears that the proposal requires significant customization at the front-end to deal with different data types. The original understanding was the translator would do the translation and then handle processing post translation so less customization is required in the front end. May some very minor checks at the front end to make sure the data will translate. The group feels there needs to be very limited preprocessing.
- There is a goal that the translator will be used to translate some data with roads or other transportation modes into WA-Trans format for exchange and sharing purposes and that data will never enter the WA-Trans database. This proposal appears to negate that functionality.
- There is concern that we not have to stringent requirements for submission. It is felt that we want the data even if we have to initially do a lot of post-processing, especially if it is the only data for that jurisdiction or mode. We can't replace manual processes with automated ones as much for the first submission.

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Because it appears that there is some varying views of what the translator does Jerry recognized the need to develop a bulleted list of what the translator has to do. Additionally Tami identified that Jerry and Chuck both need to be involved in the requirements specification process with Bfirst so we get a cohesive view of how the translator works and how the data submission works. Bfirst is only going to work on the translator but our vision for that needs to be consistent. The Specification for Data Submission Interface (High-level Draft) is in Appendix F of this document.

Action Item – Jerry will develop a bulleted list for the translator functionality.

Action Item – Tami will discuss with Chuck the response to his draft proposal and his participation in the requirements for the translator.

Policies and Processes

Tami shared Roland's draft business rules that he is proposing in his lead role in the modification to the WA-Trans data model. Roland identified that everything is soft until we are well into pilots. A lot of them have "may" in them instead of "shall". These business rules are part of the data structure for WA-Trans but also the policies and processes.

Tami identified several policies to look at and include:

- Processes for establishing agreement points,
- Feedback to data providers, process for correction,
- Strategies for resolving more than one source of data,
- Strategies for dealing with no data,
- Process for reconciling segment schemes,
- Cross walk between various road/transportation classification systems,
- QA/QC process e.g. features meeting correctly,
- Process for dealing with scale and accuracy,
- Public data policy,
- Private data for particular business needs
- Contact through which data should be authorized (County Engineers?)
- Stewardship related processes,
- Versioning and access to earlier versions,
- Update cycles,
- Notification of updates,
- Inventory of gaps in data (including attribution) for prioritization of data acquisition,

Tami got these from just the last three meetings.

Action Items – Tami (or maybe Shawn?) will go through notes and create a bulleted list of these things so they are in one place and can form the skeleton of the document. It will include Roland's list as well.

Traffic Records Strategies and Performance Measures

Tami reported that a promising avenue for funding is the Washington Traffic Records Committee. They are developing a strategy regarding goals for work on IT/GIS systems to meet their needs and one goal is specific to WA-Trans. Chris, the facilitator of the team, has asked for our assistance.

The goal (Goal 6) is:

"Create a more accurate statewide system for roadway feature and event location for improved analysis of traffic related events."

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Strategy 2 under this goal is:

“Develop a statewide transportation data layer (WA-Trans) for use in Geographic Information Systems (GIS) applications across the state.

- a. Develop a framework model and technical standards for a central repository, front-end, and back-end data translator applications.
- b. Draft data sharing agreements with city, county and state providers of transportation data.
- c. Develop a secure method for users to access transportation data layers and load into local jurisdiction applications.

Chris asked for ideas for performance measures, baseline and targets. Some ideas the group provided include:

| Performance Measure | Baseline | Target |
|--|-----------------|----------------------------------|
| Number of counties/cities for which basic data is available, based on population | 0 | 80% high populated Dec. 31, 2006 |
| Complete translator and architecture | 0 | June 30, 2005 |
| Complete processes for maintenance | 0 | Dec. 31, 2006 |
| Numbers using data set | | |
| Hits on website for access | | |
| Survey of users | | |
| Use of WA-Trans by state agencies | | |

Action Item - Tami will fill in the illustration Chris provided and send it out to the group for feedback and then return it to Chris.

The original illustration is Appendix G of this document.

Action items review & closing

Tami wants to schedule video-conferencing earlier. She will assume that Tareq will attend in Shoreline and that Ian will attend in Spokane for each meeting. This may assist us with some of the difficulties we have had (although not with the technical ones!!).

The meeting on September 13 has been cancelled. The next meeting will be:
October 25 at WSDOT NW Region HQ in Shoreline.

Additional meetings have also been added to the schedule. They are:

December 6 at WSDOT HQ in Olympia.

January 24 at WSDOT Eastern Region HQ in Spokane.

All meetings are from 9 a.m. to 2 p.m.

The next WA-Trans partner meeting is September 7 from 9 a.m. to noon with video-conferencing upon request at the WSDOT Regional HQ Offices. All steering committee members are encouraged to attend. We will be discussing the data model, business rules (such as they are now) and core attribution in detail.

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Appendix A – DRAFT Roads Core Attribution

WA-Trans

Proposed core attributes

First Draft – April 15, 2004

Primarily from 5th draft of Oregon Road Data Standard, with some CRIS attributes added.

| ITEM NAME | TYPE | WIDTH | Description |
|------------------|-------------|--------------|--|
| LENGTH | Number | 16 | Calculated length in US Survey Foot |
| RDOWNER | String | ? | Entity responsible for maintenance of segment |
| RDNAME | String | 72 | Concatenated segment name |
| DIR | String | 2 | Prefix direction (N,S,E,W,etc.) |
| NAME | String | 64 | Road name |
| TYPE | String | 3 | Type (St, Ave, Ct, etc.) |
| SUFF | String | 2 | Suffix component |
| ALIASLIST | String | 200+? | Alias list separated by ‘;’ Keywords and AKA’s |
| FROMLEFT | Number | 10 | Left low address range |
| TOLEFT | Number | 10 | Left high address range |
| FROMRIGHT | Number | 10 | Right low address range |
| TORIGHT | Number | 10 | Right high address range |
| ZONELEFT | String | 16?? | Area descriptor, left side (could be ZIP) |
| ZONERIGHT | String | 16?? | Area descriptor, right side (could be ZIP) |
| FROMMILEPOST | Number | 6 | Beginning Milepost |
| TOMILEPOST | Number | 6 | Ending Milepost |
| LCITY | String | 32 | City on left side of segment |
| RCITY | String | 32 | City on right side of segment |
| COUNTY | Number | 2 | County code for segment |
| FUNCTIONCLASS | Number | 2 | Function Class assigned by RDOWNER |
| PAVEMENTTYPE | String | 1 | Pavement Type assigned by RDOWNER |
| S_DATE_MOD | Date | 8 | Date of last modification to geometry |
| Speed Limit | | | |
| Number of Lanes | | | |

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Appendix B – DRAFT Ferries Core Attribution

| Attribute | Description | Size | Type | WA-Trans Name |
|---------------------------|--|-------------|---------------|---------------------------------------|
| Route Name | Full route name usually includes the cities traveled to or beginning and end cities | 50 | Alphanumeric | Route Name |
| Route Length | Can be either nautical or statute miles) | 3 | Numeric | |
| International or Domestic | Whether the route is domestic only, or international and domestic. Yes if it is only domestic | 1 | Boolean (Y/N) | |
| Route Abbreviation | This is the abbreviation of the route name. | 10 | Alphanumeric | Route Identifier |
| Average Sailing Duration | This is the average duration of sail for a particular route. | 4 | Numeric | Crossing Time |
| Ferry Schedule | This is a calculated schedule that overlaps days. Not sure how this will be integrated. | | | Hours not available |
| Terminal Name | This could be an end node for the ferry route, and will likely have a different mode from the ferry route mode. | | | |
| Address1 | This is the terminal street address | 50 | Alphanumeric | Road Name |
| Address2 | This is the terminal street address | 50 | Alphanumeric | |
| City | This is the city the terminal is in | 15 | Alphanumeric | |
| Zip | This is the terminal zip code | 9 | Alphanumeric | |
| County | This the terminal the county is in | 15 | Alphanumeric | |
| Latitude | This is the geographic location of the terminal | 15 | Numeric? | |
| Longitude | This is the geographic location of the terminal | 15 | Numeric? | |
| Holding space | This is a terminal by terminal based on average vehicle length | 9 | | Number of lanes |
| | Not sure. | | | System wide restrictions |
| | This would be terminal based | | | Load restrictions attached to routes |
| | This would be terminal based | | | Length restrictions attached to route |
| | This is the transportation mode type, and there would probably be two for ferries, one for the terminal and one for the route. | | | Mode Carrying Flag |
| | | | | To Milepost |
| | | | | From Milepost |

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| Attribute | Description | Size | Type | WA-Trans Name |
|------------------|--------------------|-------------|-------------|----------------------|
| | | | | GPS for routes |

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Appendix C – DRAFT Aviation Core Attribution

| <u>Attribute</u> | Description | Size | Type |
|-----------------------------|---|-------------|---------------|
| Airport Identifier | In the US begins with 'K' | 4 | Alphanumeric |
| Surface Type | Code | 3 | Alphanumeric |
| Instrument Landing Approach | versus visual | 1 | Boolean (Y/N) |
| Arc Code | Size, weight, speed & length of wings from tip to tip (can be used to determine maximum size of aviation vehicle that can land and take off | 4 | Alphanumeric |
| Width | Expressed as feet | 4 | Numeric |
| Use | This may be covered by mode, includes: apron (parking for planes) taxiway, runway | 8 | Alphanumeric |
| Elevation | Expressed as feet | 6.1 | Numeric |
| FAA Classification | From the NPIAS – National Plan of Integrated Airport Systems | 30 | Alphanumeric |
| State Classification | Washington specific | 10 | Alphanumeric |
| Airport Name | | 100 | Alphanumeric |
| Tower | Is there a tower at the airport? | 1 | Boolean (Y/N) |
| AWAS | Stands for Automated Weather Advisory System. Is there one at the airport? | 1 | Boolean (Y/N) |
| Owner | | 30 | Alphanumeric |
| Terminal | Is there a terminal at the airport? | 1 | Boolean (Y/N) |
| | | | |

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Appendix D – Draft Railroad Core Attribution

| Attribute | Description | Size | Type |
|----------------------------|---|-------------|---------------|
| Railroad Name | The Name the “line” or railroad company | 75 | Alphanumeric |
| Operator | Could be the owner, but may not be | 75 | Alphanumeric |
| Line Identifier | To be decided by WSDOT and WUTC. Simplest method that makes sense. | | |
| USDOT Number | A code for all railroad crossings. | 7 | Alphanumeric |
| Crossing Code | Type of crossing – over, under, at grade, pedestrian | 1 | Alphanumeric |
| From Mile Post | Lower mileage value of segment beginning | 6.2 | Float |
| To Mile Post | Higher mileage value of segment end | 6.2 | Float |
| Public | Railroad feature part of public railroad line? | 1 | Boolean (Y/N) |
| Track Class | Federal designator that indicates various things such as maximum speed allowed. Can be values 0 – 6 | 1 | Numeric |
| Passenger Train Uses Line | Identifies if a regularly scheduled passenger train uses the line. | 1 | Boolean (Y/N) |
| Number of Tracks | Applies both to rail lines and crossings. | 2 | Numeric |
| Type of Railroad segment | This could be part of the mode code. Possible values include: siding, mainline, industrial spur | 1 | Alphanumeric |
| Warning Device at Crossing | Code identifying whether there is sign, or lights or other types of devices. From the Federal Railway Administration Data | 2 | Numeric |
| Train Station | Applies to a node. Indicates there is a train station | 1 | Boolean (Y/N) |
| Train Station Name | The name of the train station. Applies to a node | 15 | Alphanumeric |

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Appendix E – DRAFT Non-motorized Core Attribution

We need the mode flag (inherent in the overall data model), width, surface type and owner (same as for roads--this is the agency responsible for maintenance and upkeep). I could ask for bike only/pedestrian only/etc. but nobody has that data anyway so it is pointless to ask.

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Appendix F – DRAFT Specifications of Data Submission Interface

Specifications of Data Submission Interface (High-level Draft)

The data submission interface will allow users to easily submit data to WaTrans. The interface will need to handle submissions of nodes and links, feature attribute tables, related attribute tables, event tables and metadata from a variety of GIS and CAD formats.

The submission process will require a series of steps:

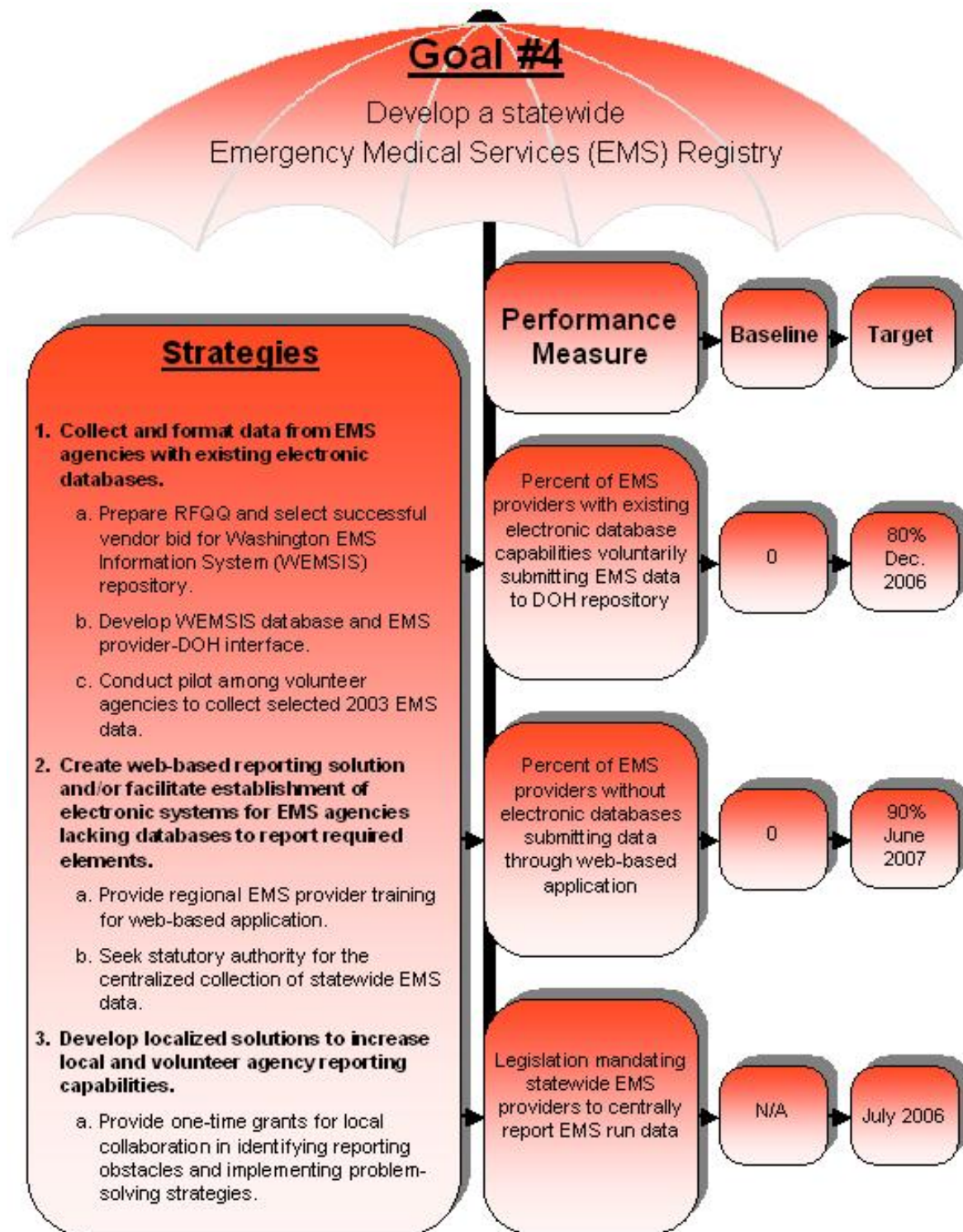
- 1) Select agency name from a list of data providers
- 2) Browse to the file to import
- 3) Browse to the associated metadata file.
- 4) Select the format of the data being submitted (ESRI, AutoCAD, Intergraph, etc.)
- 5) Match fields from submitted data model to the WaTrans data model
- 6) Generation of a UML model for the submitted data model (This will be used for update submittals or to extract data from WaTrans in the submitted data model format).
- 7) Generation of a report that describes success or failure of data submittal. This will include why a record(s) is (are) rejected.
- 8) Repeat steps 2-5 as need.

If this is the first time the user is providing data steps 3-5 will require user input, however if a valid UML model exists for the data file, steps 3-5 will be done automatically. Step 6 will be produced automatically by the data preprocessor, if it doesn't already exist. Step 7 will always be produced automatically.

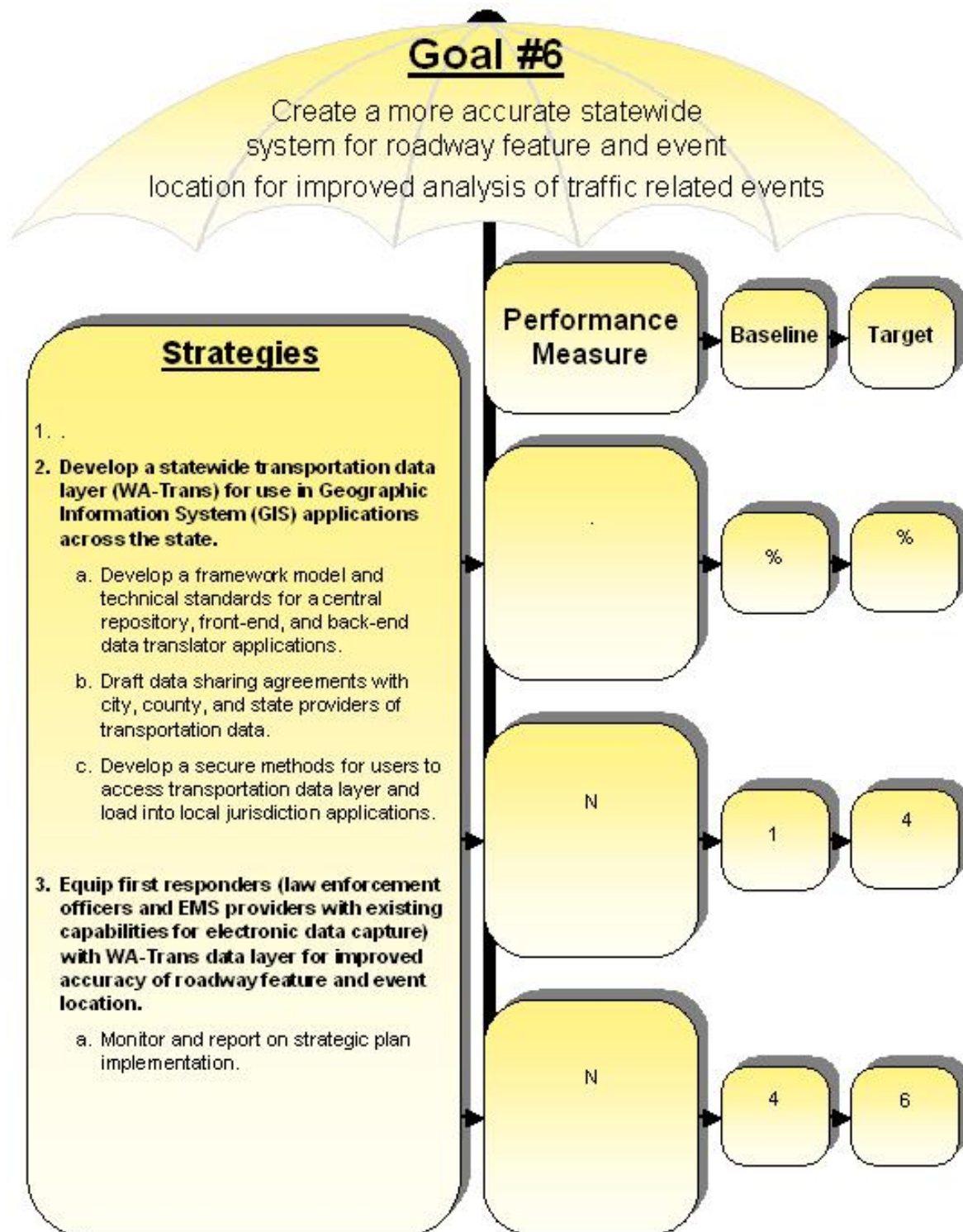
A preprocessor will check that the submitted data matches the UML model and each submitted value is valid in the WaTrans data model. It will also check that the submitted data meets the minimum core data requirements. The preprocessor will also check that metadata meets the minimum requirements and can be converted to the WaTrans metadata standard. If no metadata was supplied by the user for a submitted data file, the interface will check to see if metadata has already been submitted for this data set, if not it will query the user to supply the minimum requirements and build the metadata file from the users' responses. Problems in the validation process will be appended to the data submittal report and supplied to the user and the WaTrans data steward for each data file submitted.

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Appendix G – DRAFT Excerpt Illustration of Traffic Records Strategic Plan

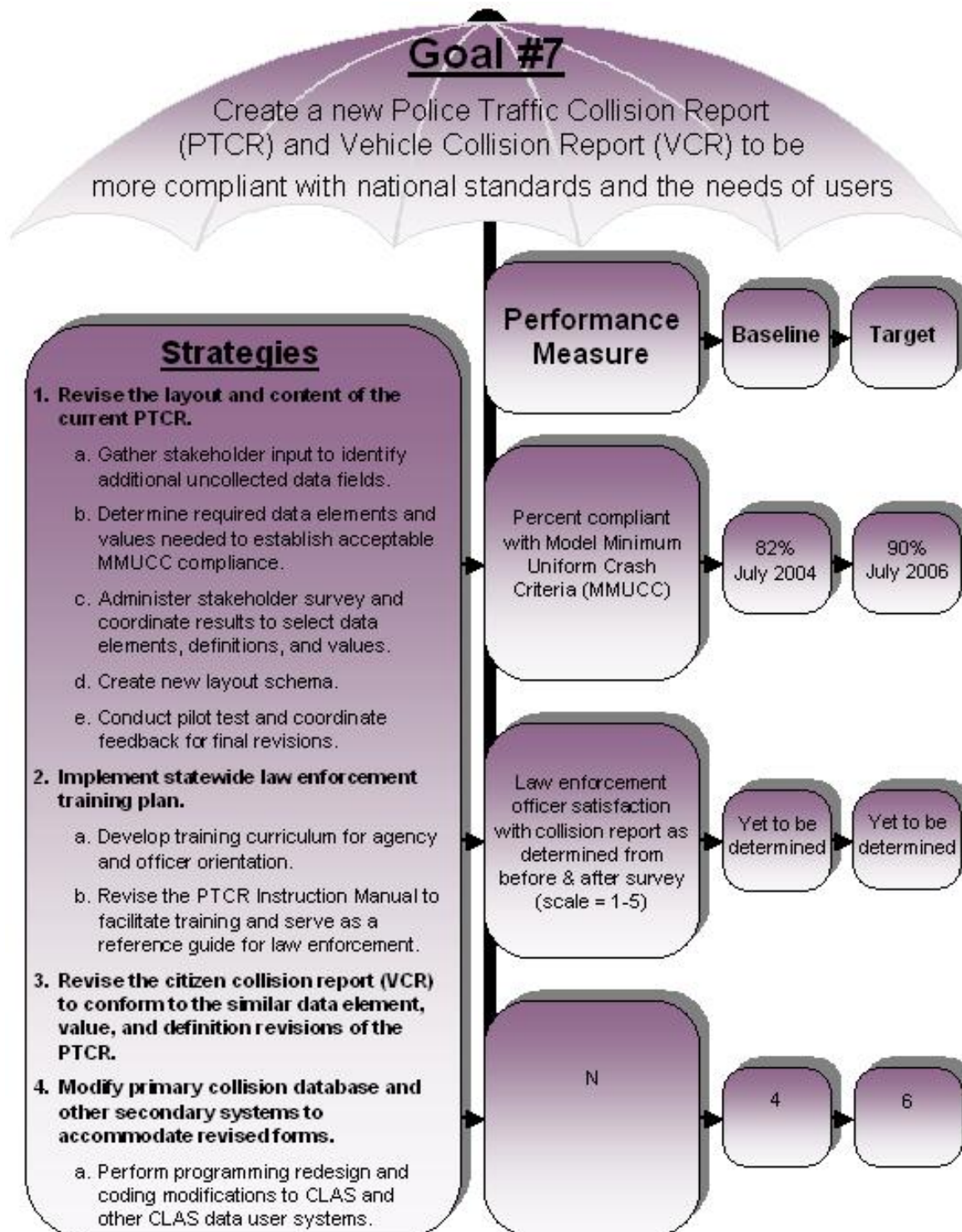


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WA-Trans Steering Committee Meeting Notes

July 19, 2004



Action Items

| WA-Trans Steering Committee Action Items List | | | |
|---|-----------------------|---|-----------------|
| What | Who | When | Status |
| Send updated Road Core Attribution out | Dave R. | ASAP | Assigned |
| Update other ferries core attribution research other WSF systems to see if there are restrictions attached to terminals or routes that are not vessel dependant | Shawn | August 6 | Assigned |
| Follow up with Rail people regarding "line identifier" attribute | Tami & Dave C. | August 20 | Assigned |
| Investigate adding a bike path field to roads core attribution | Dave R. | August 6 | Assigned |
| Check with WSDOT Pedestrian and bike people about data | Tami | August 23 | Assigned |
| Check into WA Bicycle Alliance with non-motorized staff person at PSRC | Jerry | August 27 | Assigned |
| Develop bulleted list for translator functionality | Jerry | August 13 | Assigned |
| Work with Jerry and Tami to define what is translator and what is front-end and to risk assess realistic chances of successful implementation | Chuck | Upon completion of translator functionality | Assigned |
| Work with Bfirst Systems Inc. to develop detailed requirements for the translator | Jerry, Chuck, Tami | When scheduled | Assigned |
| Go through all WA-Trans notes and document things that are the basis or ideas regarding processes and policies for WA-Trans | Tami/Shawn | October 15 | Assigned |
| Send out illustration of metrics for Traffic Records Strategic Plan regarding WA-Trans for feedback | Tami | August 5 | Assigned |
| <i>Send Tami FDGC accuracy standards</i> | <i>Wendy</i> | <i>ASAP</i> | <i>Assigned</i> |
| <i>Check metadata spreadsheet and determine which standards should be</i> | <i>All SC Members</i> | <i>July 12</i> | <i>Assigned</i> |

Note: *Italicized items are prior to current meeting but are still outstanding unless otherwise stated. Colored items are critical to other things being completed and should be looked at as high priority.*

Meeting Date: 7/19/2004

| WA-Trans Steering Committee Action Items List | | | |
|---|--------------------------------------|--|--|
| What | Who | When | Status |
| <i>required and optional.</i> | | | |
| <i>Work to identify changes for data model</i> | <i>Roland, Jerry, Dave R., Tareq</i> | <i>September 7</i> | <i>In Process</i> |
| <i>Get complete data model information and software to modify model</i> | <i>Tami</i> | <i>June 11</i> | <i>In Process</i> |
| <i>Work with Bfirst to get agreement regarding WA-Trans translator requirements and template</i> | <i>Tami</i> | <i>ASAP</i> | <i>In Process</i> |
| <i>Complete non-motorized core attribution</i> | <i>Jerry</i> | <i>July 12</i> | <i>Assigned</i> |
| <i>Incorporate agreed to changes into the Access for Viewing/Downloading document</i> | <i>Art Shaffer</i> | <i>October 18</i> | <i>To be reassigned</i> |
| <i>Update proposed core road attributes based upon input provided</i> | <i>Dave R.</i> | <i>June 1, 2004</i> | <i>Assigned</i> |
| <i>Check to see if Census has or plans to have tools for metadata.</i> | <i>Wendy</i> | <i>April 12</i> | <i>In progress</i> |
| <i>Write letters supporting WA-Trans and funding of WA-Trans on letterhead of their organizations</i> | <i>All SC Members</i> | <i>ASAP!!! - February 6 would be best!</i> | <i>PSRC, Community Transit, WUTC, Pierce County are complete</i> |
| <i>Follow up with WSDOT regarding servers and hosting WA-Trans</i> | <i>Tami</i> | <i>Long term effort</i> | <i>In process</i> |
| <i>Discuss how the Map application Chuck wrote for WA-Trans web application can be used to show project progress and where it should be served.</i> | <i>Tami and Chuck</i> | <i>ASAP</i> | <i>In Process</i> |
| <i>Meet with the WSDOT assistant Attorney General to discuss this issue and get guidance on what our options are.</i> | <i>Tami</i> | <i>When completed with Tier 2 description and issues</i> | <i>Assigned</i> |
| <i>Turn WA-Trans into Census to provide us</i> | <i>Wendy H.</i> | <i>ASAP</i> | <i>Still</i> |

Note: *Italicized items are prior to current meeting but are still outstanding unless otherwise stated. Colored items are critical to other things being completed and should be looked at as high priority.*

Meeting Date: 7/19/2004

| WA-Trans Steering Committee Action Items List | | | |
|---|--------------------|-----------------------|---|
| What | Who | When | Status |
| <i>with quarterly extracts of survey data.</i> | | | <i>checking into latest TED update status</i> |
| <i>Provide results from CRAB survey to WA-Trans.</i> | <i>Dan</i> | <i>When completed</i> | <i>In Process</i> |
| <i>Work with Nick Marquardt, PSRC, and TNM to develop scope of pilot project.</i> | <i>Tami, Jerry</i> | <i>ASAP</i> | <i>In process</i> |

Note: *Italicized items are prior to current meeting but are still outstanding unless otherwise stated. Colored items are critical to other things being completed and should be looked at as high priority.*

Meeting Date: 7/19/2004

Tami's Status Report Steering Committee Meeting July 19, 2004

This has been another busy period for me! I spent over a week working on a grant application for the Department of Homeland Security Information Technology and Evaluation Program. I applied for \$469,983.52 with a match of \$158,116.58. The grant would be for integrating data from King, Kitsap, Pierce, Snohomish and Thurston Counties and to build the translator and both front-ends. It took a significant amount of time to put this together. The WA Emergency Management Division selected three proposals to forward to DHS. They did not select ours. I spoke with Stan Ditterline, the new CIO of the WA Dept. of Military and he said that they didn't understand the value of the proposal and that they felt it was too transportation specific. I am sending it out with the USGS CAP so you can give me feedback. One thing I know is that we need a letter of support from an emergency management group of some sort! Stan did agree to go through the proposal with me in detail so I can make some corrections in the future.

The pooled fund proposal is slowly moving forward! I have heard from Liza Fox who is the project manager of the Idaho effort. I sent her information and will be speaking with her by phone soon. WSDOT has committed some money to the fund. We need to get others to as well. Leni Oman, the WSDOT Research Director has been sending the proposal to several states to solicit interest.

The work with the Traffic Records Committee also seems to have real possibility. They have identified seven goals and related strategic objectives. One of those (number 6) is to "create a more accurate statewide system for roadway feature and event location for improved analysis of traffic related events. Under this goal, strategy 2 is:

Develop a statewide transportation data layer (WA-Trans) for use in Geographic Information System (GIS) applications across the state.

- a. Develop a framework model and technical standards for a central repository, front-end, and back-end data translator applications.
- b. Draft data sharing agreements with city, county, and state providers of transportation data.
- c. Develop secure methods for users to access transportation data layer and load into local jurisdiction applications.

I have been asked to identify metrics for measuring success in this, so we will need to work on that. It appears very promising that the Traffic Records will be funded significantly in this Federal budget cycle.

I am still waiting to develop the exact scope for use of the Microsoft grant. Burt had knee surgery and had to cancel our meeting. That also puts the proof of concept off.

I attended a meeting for the Oregon T-FIT group in late June. They are extremely interested in what we are doing with identifying an architecture that will facilitate transportation framework. They are now scheduling their meetings so I can attend them and want me to actively participate in them. They had a few of things under discussion that are of interest to us:

1. They are populating their database with data from several counties. They are not doing any edge matching. They had originally decided to let the counties work that out among themselves. There was significant discussion about the ability to meet emergency management needs without connectivity. They are considering spending some money on adding new data and then using some money to work on integration as well.
2. They are concerned with their business rules for identifying nodes. They currently identify primary nodes, which are at major intersections between public roads. However sometimes a private road may join a public road or a major driveway such as to Wal-Mart or something like that will need to be illustrated. They are considering the concept of Secondary nodes for this. Originally they were going to overload a field in the data model for this, but have decided to expand the model to include this concept.
3. They are working on an MOU with US Bureau of Census regarding creation and distribution of statewide road centerline data. It generally lays the framework for partnership. It has not been approved. This might be something we want to consider in the future.

Our next meeting is September 13 from 9 a.m. to 2 p.m. in Olympia at the Transportation Building on Maple Park in room 2F-22. Video-conferencing will be available.

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Attendees:

| Member | Association | Representing |
|--------------------------|-----------------------------------|---|
| Tareq Al-Zeer | WSDOT | WSDOT |
| Roland Behee | Community Transit | Transit Organizations |
| Chuck Buzzard | Pierce County GIS | West side local government |
| Jerry Harless | Puget Sound Regional Council | MPO's, RTPPO's |
| Tami Griffin | WSDOT Geographic Services | WA-Trans (Project Manager), Facilitator |
| Wendy Hawley | Census Bureau | US Bureau of Census |
| Dave Rideout | Spokane County Engineers Office | Spokane County |
| Art Shaffer | WSDOT NW Region Maintenance & Ops | Alternate WSDOT |
| George Spencer | WSDOT | WAGIC, WSDOT |
| Shawn Blaessing-Thompson | WSDOT | Working on WA-Trans data standards |
| Mark Bozanich | WSDOT – Cartography and GIS | Share about Federal Functional Classification System – WA Process |
| Burt Buser | Bfirst Solutions, Inc. | Share regarding Microsoft grant and IBF |
| Bob Gilbert | Microsoft | Share regarding Microsoft grant and IBF |

Not Attending:

| Member | Association | Representing |
|------------------|--|--------------------------------|
| Sam Bardelson | US Geological Survey Washington Liaison | The National Map |
| Joe Bowles | Walla Walla County Surveyor | East side local government |
| Dave Cullom | Washington Utilities and Transportation Commission | Pipelines, Utilities, Railroad |
| Dan Dickson | CRAB | CRAB |
| Tony Hartrich | Quinault Indian Nation | Quinault Indian Nation |
| Tim Fields | City of Auburn Public Works | City Governments |
| Ian Von Essen | Spokane County GIS | E-911 |
| Dave Wolfer | WA Department of Natural Resources | WADNR |
| Terry Strandberg | Tulalip Tribes Community Planning Office | The Tulalip Tribes |

- Introductions, Status Questions, Time Tracking, Action Item Review
- Functional Class
- Review Draft Data Standards
- Data Modeling Meeting and Core Attributes
- Funding – CAP and Microsoft
- Meta Data Standards
- ~~Rules for Data Submission and Review Data Submission Screen~~
- ~~Quick Review Data User Front End~~
- Strategies for Completing Deliverables
- Action items review & closing

Introductions Status, Time Tracking and Review Action Items

Mark Bozanich was introduced to the group.

Since Tony and Joe did not attend the topic “Review Data Providers Screen Description” and “Data User Front End” was removed from the agenda.

After reviewing action items Wendy provided Tami with a letter regarding metadata. It appears she didn't phrase the question in a way to get the answer we are seeking about metadata tools. She will ask again. **Action Item** – Wendy follow up Census response to metadata question with further queries regarding tools.

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Tami added some items to her status report. They are:

- Tami discussed the CAP Grant and George Spencer thanked those who committed to participating in the effort. Special thanks to Linda Gerull and Chuck Buzzard from Pierce County, Jerry Harless and Andy Norton from Puget Sound Regional Council, Sam Bardelson from USGS and Mike Berman from King County for agreeing to provide resources toward the match and to Dave Rideout from Spokane County for providing input on their experience with The National Map.
- Tami has another grant for homeland security money that she had to complete this week and early next. It will be set in the Puget Sound region as well but will be more counties.
- Tami shared that she has asked for an additional resource to assist her with completing the architecture, policy and process document and working on other things so she can devote to pursuing the grant opportunities and setting up pilot projects. George indicated that it would be difficult to get a resource. Tami asked that the group really focus on completing action items so that we can get ready for a pilot. If we don't then a pilot will be funded and done the steering committee will have lost its opportunity to influence how things are done.

Functional Class

Mark Bozanich, a cartographer who is responsible for functional class mapping at WSDOT shared his knowledge of functional class (FC). The Federal Functional Classification System is a process by which streets and highways are grouped according to the service they hope to provide. FHWA sets up "guidelines" as to what % of roads you can have in a state of each type. All public roads that are open to the public are classified. Forest Service and Park Service roads are also classified. Ferry routes are the generally the same FC as connecting roads. Service roads and military roads may not be classified. Private roads are not classified. Some proposed roads have FC. The jurisdiction for the road applies for the FC for the road. Paper work is filed with:

- Urbanized (50,000 people or more) – Metropolitan Planning Organization (MPO) apply.
- For rural and small urban (less than 50,000) – they apply to the WSDOT Regional Highways and Local Programs Office.

The boundary for urbanized is set by the US Bureau of Census and then may be extended for the purpose of roads. It is usually extended to the next major junction or physical feature. Sometimes it seems to be arbitrary. Local agencies can apply for changes between boundaries. FHWA makes final decision. When WSDOT submits the FC to FHWA there is a letter stored with a number for recording purposes.

Historically WSDOT used to use Mylar. CAD came in the mid-80's. 1990 generation was done in CAD. There are two different maps. They replaced urban areas FC maps with quadrangle 1:24,000 maps. For rural areas there is a 1:100,000 map and since the late 1990's there is 1:24,000 maps base for each county used as a background and although they still are in CAD they are in layers. There is no other attribution. They could be brought into GIS.

Mark referred to two documents. The first is an FHWA publication, last updated in 1989 called "Highway Functional Classification Concepts, Criteria and Procedures". The other is a WSDOT manual updated in 2002 called "Guidelines for Amending Urban Boundaries and Functional Classification".

As far as WA-Trans is concerned we need a place to carry FC. Ultimately we want data from FC from WSDOT. They should be the data stewards and there should be one place to go to get it.

Review Draft Data Standards

Shawn Blaasing-Thompson shared her updates to the Standards. See Appendix A for the Standards. Some changes were suggested:

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- In the rules for submission section it was agreed that the Steering Committee needed to do more for that section. We need to go through the core attributes and flag the required ones. Then adjust the rules for submission accordingly. Shawn mentioned that this section was based on the brainstorming from the last meeting.
- There needs to be a from-milepost and to-milepost in section 3.2.
- Wendy requested that we start dating documents and putting it on the footer or header somewhere.
- Jeff Holm had suggested that the FGDC standard format be used to express accuracy. Wendy agreed to provide it to Tami.
- Shawn will be able to do more when we go through the metadata document and decide what is required and what is optional and what are we not supporting at all. She will also be able to do more when she has the core attribution.

Action Item – Wendy send Tami the FGDC accuracy standards

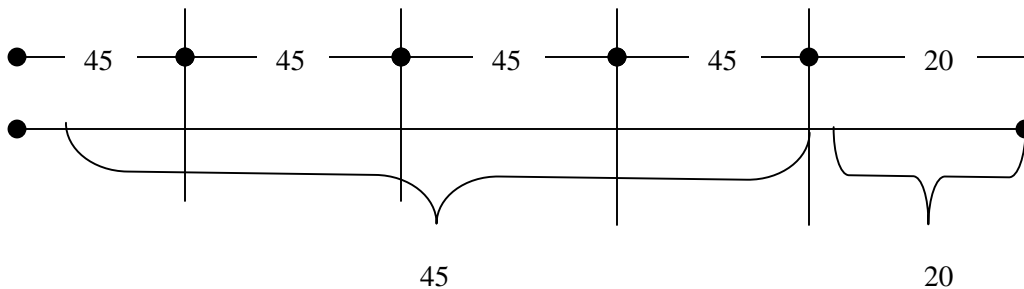
Action Item – Shawn will continue to work on the document.

Data Modeling Meeting and Core Attributes

Tami, Jerry and Roland attended a data-modeling meeting with Oregon. Jerry shared his insights from the meeting with input from Roland. To summarize:

- OR created a field called mode in response to our need to make the model multi-modal. We need to determine the domain of values for this. It is 1:1 to feature. Thus if we had a railroad running down the center of a street they would be separate but coincident segments with different model values.
- OR used points interchangeably with nodes. The values for segment ID's and node ID's are perpetual over time. Since they last forever if we have more complex information we can carry that and attach it to a node ID or segment ID. That may be how we handle multi-modal interchanges.
- There is an update that splits a segment they retire the old segment and create two new ones. PSRC is saving a parent-child relationship that might allow us to provide a change list.
- OR is not doing edge matching. They are leaving that up to the data providers and the process. It is their assumption that two providers trying to use the framework with mismatched edges will get together and solve the problem. They are not using Dueker's unless they absolutely have to.
- They are using the shape file as the interchange format. Attributes such as number of lanes, etc. are event fields.

That lead to a discussion of how we want to do this for things such as speed limits. Here is an illustration of the options:



The top line shows speed limit as segment based and the bottom shows it as event based. We have to pick which we want for each attribute.

Funding – CAP and Microsoft

Bob Gilbert from Microsoft and Burt Buser from Bfirst Solutions, Inc. attended the meeting to meet everyone and share with the group about the \$29,000 grant WA-Trans has received from Microsoft that Bfirst Solutions, Inc. will administer and about another potential opportunity we may want to take advantage of. The grant we received is called an Application Desktop Deployment (ADD) grant. It is for

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the purposed of deploying desktop technology. Part of the meeting is to look at how we can use those funds.

Tami explained that she had thought getting started with our translator by either scoping a very simple fundamental part and implementing it or just getting good requirements for it might be a good use of the funds.

Burt shared about the Interactive Bridge Framework (IBF). A demo can be found at the MSDN webpage under IBF. It allows for intra-agency collaboration so that they can use data from various sources and make them actionable in a context sensitive way. It uses smart tags that are XML extended and library created. Everything can then be catalogued. Tami shared that she saw an online demo and didn't think it would apply to WA-Trans, but Burt pointed out that we could use it to collect data from various partners. There is also significant resistance to allowing access into local government databases even in a secure situation. It seems most likely that we want the transaction initiation to come from the data provider not WA-Trans.

Burt asked for metadata and data "slices" that would allow him to develop a proof of concept. The proof of concept would be for Microsoft and could lead to some funding that might allow for a more robust development.

Dave Rideout suggested that we might use the \$29,000 for collecting data statewide so we have the data and can use it for determining what our obstacles may be.

After some discussion two things were agreed to:

1. Spokane County will provide some data and metadata for testing. Pierce County may provide it. Chuck must check to see if they can. Bfirst Solutions, Inc. would have to sign an agreement in the use of the data. Tami will check to see if WSDOT can provide some data and see if she can get a location so the data can be sent via FTP. This can be used for requirements for the translator and IBF proof of concept. It was suggested that a shape file as well as metadata and XML document for the centerline be sent.
2. The \$29,000 will be spent on developing a requirements document for the translator. Tami will work with Burt on doing that. We will need some involvement from the Steering Committee on those requirements.

Action Items – Chuck will check about providing the data.

Action Item – Tami will check about using WSDOT data and an FTP site.

Action Item – Dave will send Spokane County data.

Burt and Bob also shared about a tablet PC program and other programs that Microsoft enterprise customers could qualify for.

Meta Data Standards

Wendy developed a detailed spreadsheet she used to compare the ISB WAGIC standards, FGDC standards and ESRI supported metadata fields. The ISB Basic Subset must be used. Wendy identified those in red with column one being yellow. The ISB Working Subset is optional and we need to go through it and decide what we need to use. It is identified with orange for column one. Everything else is also optional and Wendy identified in Blue text the items that she thought we might want to use.

There is a lot that is in ISB that ESRI doesn't appear to support. We may need to make some equivalencies between ISB and ESRI because the contacts in ESRI are for metadata and the ISB are for data. ISB appears to have some duplication as well. Tami will report that.

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Incoming data requirements are needed and they will be a subset of outgoing requirements. Outgoing metadata will include a description of the processing, etc.

It was suggested that everyone look at this and send suggestions to Wendy and cc Tami on them. We need to decide so we can complete our standards. Chuck suggested taking the list to a metadata staff person. It was agreed that was a good strategy.

Action Item – All steering committee members will check the spreadsheet Wendy did comparing metadata standards and determine which should be required beyond the ISB Basic, which should be optional and which should be excluded. Also make sure you consider what is incoming versus outgoing. Using a metadata resource in your organization might be a good idea.

Action Item – Tami will check with Jeff Holm and George Spencer regarding the apparent duplication of metadata for dates in the ISB standard.

Strategies for Completing Deliverables

We need strategies for getting all this work done as soon as possible so when we get funding for a pilot we are ready to do one. The following is a high-level view of what needs to be done and how we agreed to handle it.

Data Model – domain, event tables, multi-modal transfer points, business rules to support, core attribution as it applies.

It was agreed that a team would be formed to work on the data model. The participants are: Roland Behee, Jerry Harless, Dave Rideout, and Tareq Al-Zeer. Tami want to be kept in the loop. Roland will lead the effort. Much of the work will be done via e-mail and if a meeting is needed Dave can attend by phone. This must be completed by September 7 for the September 13 meeting.

Standards - This includes completing core attribution, metadata, categories for attribution and data content.

Shawn will continue to work on this. Ron has agreed she can spend more time on this and Tami may give her more responsibility to seek out some of the information for some of the sections.

Architecture – Requirements for WA-Trans, requirements for individual software utilities, versions identified for supporting software, hardware to be used.

Chuck agreed to take on the “Front-end for Data Providers” high-level specifications since Tony has not completed these yet. Tami will figure out how to complete these after Bfirst Solutions, Inc. does the requirements for the WA-Trans Translator. The goal would be to do the requirements using the same format and to the same level of specificity.

Policies and Processes – This requires further definition and someone needs to go through the notes to determine what has already been identified and what needs to be discussed.

We will decide on this at the next meeting.

Action Item – Roland, Jerry, Dave R. and Tareq will work together via e-mail and in meetings when needed to identify and document changes needed to the data model by September 7.

Action Item – Tami will work with Chad to get complete information on the data model and find out what software they are using for the modeling.

Action Item- Tami will work with Shawn and Ron Cihon to determine her availability and to develop a plan to complete the standards as much as possible with the information available.

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Action Item – Tami will work with Bfirst Solutions, Inc. to get an agreement complete regarding WA-Trans Translator requirements and get and format or template from them to use on other requirements.

Action Item – Chuck will develop draft high-level specification for a “front-end for data providers” for WA-Trans for the next meeting.

Action Item – Tami will put a discussion on Policies and Processes on the agenda for the next meeting.

Action items review & closing

The next meeting is July 19, 2004 – WSDOT Eastern Region Office in Spokane.

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Appendix A – DRAFT WA-Trans Data Standards

Data Standard Goals for WA-Trans

- Establish standards which enhance the will and ability of partners to collect and maintain the data
- Match the standard to the ability of the partners to collect and maintain data
- Identify a standard which allows data quality to improve over time – long term data maintenance and updates
- Identify funding incentives for partners to participate
- Standards need to recognize capabilities of existing technology and upgrade with technology improvements

Standards that will work in phases:

- Meet most important business needs
- Facilitate Data integration
- Facilitate maintaining data long term

Data needs to be accurate, complete, non-complex, well documented, update cycle, relevant, digital, open standard format, import to digital mapping systems

Work thorough data model

Outline for Data Standards – Draft

1. Introduction

1.2 Goals of the Data Standards

The goals of the WA-Trans framework data standards are:

- To establish standards which enhance the will and ability of partners to collect and maintain the data
- Match the standard to the ability of the partners to collect and maintain data
- Identify a standard which allows data quality to improve over time – long term data maintenance and updates
- Identify funding incentives for partners to participate
- Standards need to recognize capabilities of existing technology and upgrade with technology improvements

1.3 Intended use description

The Purpose of the WA-Trans Data Standards is to set a set of common requirements for the collection and exchange of data layers from a variety of geographic sources (GIS, CAD, etc.) These layers will create a statewide set of data layers developed as a comprehensive transportation network.

1.4 Standard development Procedure

These standards were developed by the WA-Trans framework steering committee for the purpose of collecting and managing data for two pilot projects. These standards will be adjusted as necessary for as experience is gaining during these pilot projects.

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2 Scope – Basic Overview of data types, mechanisms

2.1 Definitions

Points -

Lines

Events

Polygon – reference/clipping resource

I expect there will be others as deemed necessary

2.2 Symbols and Abbreviations

ROW Right of Way

LRS Linear Reference System

Others as deemed necessary

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- 3 **Data Characteristics** (Oregon Road Centerline data standard to be adjusted for WA-Trans. Information for events placed on transportation features roads, rail etc.)
 - Need to decide on mandatory, conditional and optional fields for data layers

These will be reorganized with a more generic core attribution and then dig down into more specific core attribution by transportation mode. Should have more information after this meeting. Also, will cross check this section with the data model to be sure everything is covered.

3.1 Points

- Based on dynamic segmentation of roadways (using mileposts or distance from intersection), x,y coordinates from GPS, or geocoded addressing information.

| Field Name | Type | Width | Description |
|------------|--------|-------|--------------------------------|
| Shape | Point | 9 | Road Point placed by software |
| Unique-ID | Number | 15 | Framework ID from data steward |
| X-Coord | Number | 15 | Longitudinal Coordinate |
| Y-Coord | Number | 15 | Latitudinal Coordinate |
| Type | String | ? | Type of point event |

3.2 Lines

- Based on dynamic segmentation of roadways

| Field Name | Type | Width | Description |
|-----------------------|--------|-------|---|
| Shape | Line | 9 | Order of coordinate pairs representing a road segment |
| Unique-ID | Number | 15 | Framework topological ID from data steward |
| F-Node | Number | 8 | From node: start point identifier for the road centerline |
| T-Node | Number | 8 | To Node: end point identifier for the road centerline |
| Local-ID | String | 11 | Local Road Centerline feature identifier |
| RdOwner | String | 50 | Entity responsible for maintenance of segment |
| RdNumber | String | 50 | Roadway ID number (002, 101) |
| Address | | | |
| Left low | Number | 10 | Left low address range |
| Left high | Number | 10 | Left high address range |
| Right low | Number | 10 | Right low address range |
| Right high | Number | 10 | Right high address range |
| Prefix direction | String | 3 | Suffix directional component of segment name |
| Street name | String | 50 | Road name |
| Street type | String | 3 | Road type (ex. ST, AVE, BLVD) component of seg. |
| name Suffix direction | String | 3 | Suffix directional component of segment name |
| Zone | String | 10 | Used with geocoding 0 usually zip code |

3.3 Other Data Fields

| | | | |
|--|----------|-----|--|
| Recommended other | | | |
| Number of lanes | String/# | 2 | 2, 4, 6 multidirectional, two-lane... |
| Speed limit | String/# | 8/2 | Number unless multiple speeds posted? |
| Jurisdiction | String | 20 | County, city, State, Feds? (FIPSID) |
| Facility Name | String | 50 | Long name |
| Function Class | String | 10 | Functional Class definition (urban rural...) |
| Different ID for different jurisdictions, fed/state/county/city (USGS 1-7 designator?) | | | |
| More research to do here, and a crosswalk between jurisdictions needs to be made. | | | |
| Pavement Type | String | 20 | (Asphalt, concrete...) |
| Alias Name | String | 50 | Alternate Road name |
| Up to three alias names for state #, County #, local name | | | |

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3.4 Notes and Misc... to be filed later

I may be able to make some suggestions for ID fields to make querying out data by jurisdiction. More to come here.

There was some discussion regarding functional class. What is the relationship between functional class (Federal Highway Administration's road classifications) and Census CFC's based upon USGS Road classifications 1 –7 from trail to highway. We need to create a crosswalk for them. This may be part of the standards definition.

USGS Code – Federal, State, Paved, etc.

FHWA includes codes for different road types – e.g. 7 – 9: Rural codes; 13, 14, 15, 16, 17, 19 – Urban Codes from collector to major urban arterial.

Ramps – See notations from April meeting on WSDOT ramp system. More research is being done to see how other organizations handle classifying their ramps.
May need an alias name here to use a connector between state and local agency ramp codes.

Other Transportation modes

- Bike
- Foot
- Ferries
- Aviation
- Railroad

Data reference points on the boundary layers where jurisdictions cross. Pseudo-nodes with jurisdictional ID.

Others as deemed necessary

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4 Data Content

4.1 Rules for submission – See processed QA/QC

Best available datasets must be topologically clean when in GIS format

Line features should be contiguous across coverage boundaries (i.e. where a single geographic feature is split into adjacent coverages or tiles, it should be edge-matched).

Every feature (point, line, etc) should have one attribute record.

Each submitted data layer needs to have complete attributes as designated by the core attributes documentation above.

Frequency updates will be established and a reminder will be set based data stewards previous submissions

Must only submit data of which you are steward (facility owner)

All data will have metadata that will need to be signed off on with data submission.

More information in this area although some of this will be handled when setting up the translator.

4.2 Data Standards

Translator will be used to bring all data to this level and outputs to the level needed by the data requestor.

Sample Data Set Standards

| | |
|-----------------------|--|
| Horizontal Datum: | NAD 83/91 |
| Vertical Datum: | NGVD 88 |
| Projection System: | Lambert Conic Conformal |
| Coordinate System: | WA State Plane Coordinates |
| Coordinate Zone: | South |
| Coordinate Units: | Feet or meters if NAD83/91 |
| Accuracy Standard: | replace with target table |
| Vector Import Format: | .shp, .dgn, .dxf, .dwg, .mdb |
| Database format: | .MDB (geodatabase), excel, .DBF, or .txt (.CVS?), XML, .mls, .xls |
| Metadata: | ISB required and optional |

4.3 Metadata Standards

4.3.1 Basic List - Required

Basic information about the data set

Title, Publisher

Description

Abstract, Purpose

Time Period of Content

Range of Dates / Times

Beginning Date, Ending Date, Currentness Reference

Keywords

Theme

Theme Keyword

Place

Place Keyword

Data Quality Information

Lineage

Source Information, Source Time Period of Content

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Range of Dates / Times

Beginning Date, Ending Date

Entity and Attribute Information

Overview Description, Entity and Attribute Overview

Point of Contact / Contact Information

Contact Person, Contact Organization, Contact Position, Contact Address

Address Type, Address, City, State or Province, Postal Code

Contact Voice Telephone, Contact Facsimile Telephone, Contact Electronic Mail Address

4.3.2 Working Subset - Required

Status – Maintenance information for the data set

Progress – Complete, in progress, or planned

Frequency of updates

Spatial Domain – geographic domain of dataset

Bounding Coordinates

West, North, East, South

Theme, and Place Keywords

Access and Use Constraints

Attribute Accuracy

Attribute Accuracy Report – explains the accuracy of the features

Positional Accuracy – Estimate of horizontal accuracy of spatial objects

Vertical Position Accuracy

Vertical Positional Accuracy Report – Vertical accuracy

Source Scale

Source Contribution – info on contribution dataset

Spatial Data Organization Information

Direct Spatial Reference Method

Raster Object Information

Raster Object Type

Spatial Reference Information

Horizontal Coordinate System Definition

Planar

Grid Coordinate System (name)

State Plane Coordinate System

SPSC Zone Identifier

Planar Coordinate Information

Distance Units

Geodetic Model

Horizontal Datum Name

Ellipsoid Name

Semi-major Axis

Denominator of flattening ratio

Vertical Coordinate System Definition

Altitude System Definition

Altitude Datum Name

Depth System Definition

Depth Datum Name

Detail Description

Entity Type

Entity label

Entity definition

Attribute

Attribute Label

Attribute definition

Attribute Domain Value

Enumerated Domain

Enumerated Domain value

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- Enumerated Domain definition
- Range Domain
- Range Domain Max
- Range Domain Min
- Code set Domain
- Codeset Name
- Codeset Source
- Attribute Units of Measurement
- Attribute Measurement resolution
- Citation Information
 - Originator, Publication Date, Title

4.3.3 Recommended Subset

- Citation
 - Supplemental Information
 - Temporal
 - Temporal Keyword
 - Temporal Keyword Thesaurus
 - Temporal Keyword
 - Data Set Credit
 - Security Information
 - Security Classification System
 - Security Classification
 - Security Handling Description
 - Attribute Accuracy Value
 - Attribute Accuracy Explanation
- Completeness report
 - Horizontal Positional Accuracy Value
 - Horizontal Positional Accuracy Explanation
 - Source Citation
 - Map Projection
 - Map Projection Name
 - Individual Map Projection Descriptions (See FGDC Outline)
 - Entity and Attribute Detail Citation
- Distribution Information
- Distributor
- Distribution Liability
- Standard Order Process
- Digital Transfer Options
 - Online Options
 - Computer contact Information
 - Network Address
 - Network Resource Name
 - Dialup Instructions
 - Access Instructions
- Technical Prerequisites
- Metadata Reference Information
 - Metadata Data
 - Metadata Contact
 - Publication Information
 - Publication Place
 - Contact Person Primary
 - Contact Organization Primary
 - Hours of Service
 - Contact Instructions

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5 Data Quality

5.1 Data Scale

This will be a multi-scale dataset

1:1200, 1:6000, 1:24000 Urban
 1:6,000, 1:24,000, 1:48,000 Rural
 1:24,000, 1:48,000, 1:100,000 Remote

5.2 Data Accuracy

| | Urban | | | Rural | | | Remote (ag/forestry) | | |
|-------------------------------|-------------|------------|------------|-------------|------------|------------|----------------------|------------|------------|
| | <i>High</i> | <i>Med</i> | <i>Low</i> | <i>High</i> | <i>Med</i> | <i>Low</i> | <i>High</i> | <i>Med</i> | <i>Low</i> |
| <i>Spatial Accuracy</i> | 1 ft. | 5 ft. | 40 ft | 5 ft | 40 ft | 50 ft | 40 ft. | 50 ft. 1 | 00 ft |
| <i>Update Frequency</i> | 1 mos. | 6 mos. | 1 yr. | 1 yr. | 2 yrs. | 3 yrs. | 1 yr. | 2 yrs. | 5 yrs. |
| <i>Attribute Completeness</i> | 95% | 80% | 70% | 95% | 80% | 70% | N/A | N/A | N/A |
| <i>Source Scale</i> | 1:1200 | 1:6000 | 1:24 K | 1:6000 | 1:24 K | 1:48 K | 1:24K | 1:48K | 1:100K |

6 Stewardship

Update Cycles

Need decisions on best available data for each data layer and/or scale.

Here data could be submitted to source agency when concatenating with tabular or spatial data. If this is acceptable this would reduce the need to concatenate data repeatedly with each update cycle.

Also will need to define a regular update cycle for data. Many agencies have an annual update cycle based on budget cycle. Would this dictate framework update cycle? Yearly updates, quarterly?

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7 Data Layers

7.1 Core Data Sets:

- State Highway
- Highway Ramps – WSDOT naming convention
- Milepost
- Scenic Roads - attribute
- Local Roads
- Tribal Road Designators
- Non-Motorized Transportation Modes
- Railroads
- Port Facilities
- Ferry Transit Routes – include ferry terminal locations, includes staging areas as segments and connector roads
- Aviation – includes airport locations, connector roads and runway segments

7.2 Reference (Boundary) Datasets:

- County Boundaries
- Reservation Boundaries
- City boundaries – too dynamic?

7.3 Supporting Datasets:

- CRIS Data – Core attribution
- Survey Data – Core attribution
- Bridges, culverts – attribute (event), eventually BEarms for bridge

7.4 Interfaces

- Mobility
- Geospatial One-stop

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8 References

All Roads (HARP), ODT, Watterson and Brady, 2003 v5 draft
ANSIT, Geographic Information Framework-Data Content Standards for
Transportation Networks: Roads
Oregon Road Centerline Standard, ODT, V.2, 2003 draft
Michigan Framework – web
http://www.michigan.gov/cgi/0,1607,7-158-12759_14194---,00.html
Arizona Framework – web
Dueker white paper
King Co Standards
http://www.metrogis.org/data/standards/address_guidelines.shtml
Minnesota Data Standards
<http://www.co.clay.mn.us/Depts/GIS/GISDStan.htm>
WAGIC Metadata
http://wagic.wa.gov/techstds2/wl_subsetv1.htm
Geospatial One Stop
<http://www.geo-one-stop.gov/Standards/Base/index.html>

These will need to be cited as necessary

Action Items

| WA-Trans Steering Committee Action Items List | | | |
|---|-------------------------------|---------------------|---------------------------------------|
| What | Who | When | Status |
| Send Tami FDGC accuracy standards | Wendy | ASAP | Assigned |
| Check about providing data to Bfirst | Chuck, Dave, Tami | ASAP | Dave – Done Chuck, Tami – Assigned |
| Check about FTP site for sending data | Tami | ASAP | Assigned |
| Check metadata spreadsheet and determine which standards should be required and optional. | All SC Members | July 12 | Assigned |
| Check with WAGI C regarding duplication | Tami | ASAP | Complete |
| Work to identify changes for data model | Roland, Jerry, Dave R., Tareq | September 7 | Assigned |
| Get complete data model information and software to modify model | Tami | June 11 | Assigned |
| Work with Shawn and Ron Cihon to determine availability to work on standards | Tami | ASAP | Assigned |
| Work with Bfirst to get agreement regarding WA-Trans translator requirements and template | Tami | ASAP | Assigned |
| Develop high-level specifications of front-end for data submission | Chuck | July 12 | Assigned |
| Put discussion of Policies and Processes document on next agenda | Tami | July 12 | Assigned |
| <i>Find out from city reps if there is a standard among cities regarding functional class of roads.</i> | <i>Tami</i> | <i>June 1, 2004</i> | <i>Assigned</i> |
| <i>Get information on USGS Road Classification System for next meeting</i> | <i>Sam</i> | <i>June 1, 2004</i> | <i>Assigned</i> |
| <i>Incorporate agreed to changes into the Access for Viewing/Downloading document</i> | <i>Joe</i> | <i>June 1, 2004</i> | <i>Assigned</i> |
| <i>Update proposed core road attributes based upon input provided</i> | <i>Dave R.</i> | <i>June 1, 2004</i> | <i>Assigned</i> |

Note: *Italicized items are prior to current meeting but are still outstanding unless otherwise stated. Colored items are critical to other things being completed and should be looked at as high priority.*

Meeting Date: 6/7/2004

| WA-Trans Steering Committee Action Items List | | | |
|---|---|--|--|
| What | Who | When | Status |
| <i>Check to see if Census has or plans to have tools for metadata.</i> | <i>Wendy</i> | <i>April 12</i> | <i>In progress</i> |
| <i>Set up meetings with various non-road transportation mode data experts to determine core attribution for them.</i> | <i>Tami</i> | <i>April 19</i> | <i>Completed WSF, Aviation</i> |
| <i>Attend the meetings with Tami and help develop core attribution for the assigned modes: Bike, Foot – Jerry (no meeting) Ferries – Jerry, Aviation – Roland, Railroad – Dave Cullom</i> | <i>Tami, Jerry, Roland, Dave Cullom</i> | <i>After Tami sets up the meetings</i> | <i>Completed WSF, Set up Aviation</i> |
| <i>Write letters supporting WA-Trans and funding of WA-Trans on letterhead of their organizations</i> | <i>All SC Members</i> | <i>ASAP!!! – February 6 would be best!</i> | <i>PSRC, Community Transit, WUTC, Pierce County are complete</i> |
| <i>Update Accuracy in Business Needs Matrix and send to Tami</i> | <i>Dave Wolfer</i> | <i>February 27, 2004</i> | <i>In Process</i> |
| <i>Follow up with WSDOT regarding servers and hosting WA-Trans</i> | <i>Tami</i> | <i>Long term effort</i> | <i>In process</i> |
| <i>Discuss how the Map application Chuck wrote for WA-Trans web application can be used to show project progress and where it should be served.</i> | <i>Tami and Chuck</i> | <i>ASAP</i> | <i>In Process</i> |
| <i>Meet with the WSDOT assistant Attorney General to discuss this issue and get guidance on what our options are.</i> | <i>Tami</i> | <i>When completed with Tier 2 description and issues</i> | <i>Assigned</i> |
| <i>Turn WA-Trans into Census to provide us</i> | <i>Wendy H.</i> | <i>ASAP</i> | <i>On-going –</i> |

Note: *Italicized items are prior to current meeting but are still outstanding unless otherwise stated. Colored items are critical to other things being completed and should be looked at as high priority.*

Meeting Date: 6/7/2004

| WA-Trans Steering Committee Action Items List | | | |
|---|--------------------|-----------------------|--------------------------------------|
| What | Who | When | Status |
| <i>with quarterly extracts of survey data.</i> | | | <i>update coming around April 20</i> |
| <i>Provide results from CRAB survey to WA-Trans.</i> | <i>Dan</i> | <i>When completed</i> | <i>In Process</i> |
| <i>Work with Nick Marquardt, PSRC, and TNM to develop scope of pilot project.</i> | <i>Tami, Jerry</i> | <i>ASAP</i> | <i>In process</i> |

Note: *Italicized items are prior to current meeting but are still outstanding unless otherwise stated. Colored items are critical to other things being completed and should be looked at as high priority.*

Meeting Date: 6/7/2004

Tami's Status Report Steering Committee Meeting June 7, 2004

This has been a very busy six weeks and it just seems to be getting busier! To keep up with the funding opportunities is taking most of my time. The first piece of news is related to that. I have asked for a full-time project management trainee that could assist with completing the architecture, process and policies document and run a pilot if we end up doing more than one at once. We seem to have two tracks going right now and I can't do both. One is grant writing and selling the project and the other is keeping us moving towards a pilot with deliverables moving forward so we are ready for a pilot when the funding is in place.

I attended the GITA conference in Seattle. It was a really well run conference and I saw a few of you there. At the conference I had the opportunity to meeting with John Auble of GDT (now owned by TeleAtlas). I discussed what we were doing with them and gave them some idea of why GDT won't work for us. They are very interested in working with us. However, until we have our requirements written out (another "to-do") we can't measure how they will or will not meet our needs. Additionally to do a real return on investment calculation we need to have done at least a pilot or two so we know what it would cost us to do it ourselves. At the least I let them know that we wanted to keep in touch and help each other out. On a related note I will be managing WSDOT's GDT contract as of the end of the summer.

I gave a presentation to the Washington Traffic Records Committee. It was very well received! The committee comprises State Agency participants from Department of Health, Department of Licensing, Assistant to the Court, Washington State Patrol and WSDOT as well as some others I'm sure I have forgotten. They agreed that WA-Trans was important to their mission regarding traffic safety reporting and linking different accident response and tracking systems together across the state. They are putting a strategy together that they will use to apply for Transportation funding from the Federal government. Part of that request will be for WA-Trans. I need to decide what is a reasonable amount to ask them for. Does anyone have ideas of how to do that? I will continue to attend their meetings.

I apply for, and we got, a grant from Microsoft for \$29,000! It is administered through B-First, a Microsoft partner. It can be spent on services, so I am looking at maybe getting started on building a translator. Burt Buser from B-First and Bob Gilbert from Microsoft will be at our meeting so we can discuss this with them. I need to put a specification and agreement together with them soon! There

may be other opportunities here, if we find a relationship between things Microsoft is trying to promote and our project. However we need to make sure what we are doing does move WA-Trans forward and that we can work with what ever they give us.

We had a meeting with Oregon DOT people and various WSDOT reps from railroad, aviation and ferries to discuss and agree to the data model as it stands now. Jerry and Roland attended the meeting. We have some decisions to make and some minor changes to make so it will work for us in Washington, but as far as what we were doing with Oregon that is done.

I am in the process of applying for a USGS Cooperative Agreement Program (CAP) request that we must match 100%. It is for \$75,000 to provide data for The National Map. We are going to ask for funding to prototype the translator and integrate data from Pierce and King Counties. The USGS has agreed to host that data with their other Puget Sound data at Menlo Park on The National Map (TNM). Pierce County, Puget Sound Regional Council, King County, WSDOT and TNM have agreed to partner in this request and provide resources for match. I have to have it done Thursday morning this week so that is what I am spending all my time on!

Because of the due date of the CAP the schedule for giving a presentation to the Geographic Information Technology subcommittee of the Information Services Board (ISB) has been changed from June to September.

Our next meeting is June 19 from 9 a.m. to 2 p.m. in Spokane at the Eastern Region Transportation Building on Mayfair. Video-conferencing will be available.

WA-Trans DRAFT Conceptual Architecture

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Attendees:

| Member | Association | Representing |
|-------------------------|---|---|
| Sam Bardelson | US Geological Survey Washington Liaison | The National Map |
| Roland Behee | Community Transit | Transit Organizations |
| Joe Bowles | Walla Walla County Surveyor | East side local government |
| Jerry Harless | Puget Sound Regional Council | MPO's, RTPPO's |
| Tami Griffin | WSDOT Geographic Services | WA-Trans (Project Manager), Facilitator |
| Wendy Hawley | Census Bureau | US Bureau of Census |
| Dave Rideout | Spokane County Engineers Office | Spokane County |
| Art Shaffer | WSDOT NW Region Maintenance & Ops | Alternate WSDOT |
| Ian Von Essen | Spokane County GIS | E-911 |
| Shawn Blaesing-Thompson | WSDOT | Working on WA-Trans data standards |

Not Attending:

| Member | Association | Representing |
|-------------------|--|--------------------------------|
| Gloria Skinner | WSDOT Office of Freight Strategy and Policy | Freight Interests |
| Chuck Buzzard | Pierce County GIS | West side local government |
| Dave Cullom | Washington Utilities and Transportation Commission | Pipelines, Utilities, Railroad |
| Dan Dickson | CRAB | CRAB |
| Tony Hartrich | Quinault Indian Nation | Quinault Indian Nation |
| Tim Fields | City of Auburn Public Works | City Governments |
| Dave Wolfer | WA Department of Natural Resources | WADNR |
| Jennifer Sorensen | Lummi Planning Department | The Lummi Nation |
| Terry Strandberg | Tulalip Tribes Community Planning Office | The Tulalip Tribes |

- Introductions, Status Questions, Time Tracking, Action Item Review
- Review funding requests
- Review Draft Data Standards
- Review Conceptual Architecture Update
- ~~Review Data Providers Screen Description~~
- Review Update for Access for View and Download Description
- Review Core Attribution for Roads
- WA-Trans Architectural Outline
- List of Processes to be Defined
- Next Meetings
- Action items review & closing

Introductions Status, Time Tracking and Review Action Items

There were problems with video-conferencing. Eastern Region double booked the conference room. We have had several of these over the past several meetings. Dave Rideout is concerned with time lost in the meetings. He has been tracking the time spent dealing with this. Dave also brought up the earliest meeting when he felt the group had committed to not video-conferencing, but attending in person. The notes (July 16, 2002) did refer to a desire for attendance in person, but recognized that attendance by videoconference may be necessary.

Action Item – Dave R. will send Tami the time he has tracked and Tami will work with the people who run the video-conferencing to resolve these issues at future meetings.

Since Tony was unable to attend the topic “Review Data Providers Screen Description” was removed from the agenda.

WA-Trans DRAFT Conceptual Architecture

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Tami added some items to here status report. They are:

- Related to the NHTSA Tami is working on a presentation to give to the multi-agency traffic records team. This team is going for some new Federal Highways money for safety related efforts using information technology. There is a substantial amount of money and WA-Trans could be part of that mix if we can show how it supports various applications that are safety centric.
- Tami is going to write a letter to the people from the USGS who developed a Return on Investment (ROI) for the National Map. The letter will request detailed information and maybe assistance to run the ROI for the transportation layer only for Washington State. The ROI showed a four-year time frame to recover costs and then a sharply increasing ROI after that as more applications using TNM come online. They used information about counties and applications and GIS sophistication in their algorithm and it seems like something that would translate well for WA-Trans purposes.
- The final (we hope) data-modeling meeting with Oregon will be held in Portland on May 25th. Attendees include Oregon participants and data modelers, WA-Trans Steering Committee members who volunteered to work on the data modeling, WSDOT GIS Data Steward and manager of data modelers at the WSDOT Office of Information Technology as well as representatives of various transportation modes at WSDOT. We will walk through the data model and get final approval or feedback regarding the model and also set up meetings with the various mode representatives to determine core attribution for each mode.

Review Funding Requests

Tami has worked on several funding requests. The Federal Earmark request had three versions, one for Senator Murray, one for Senator Cantwell, and one for the House of Representatives (actually there were several different ones for the various House members but since WA-Trans request is going to all of them a single one was done). For these requests the title of "Intergovernmental Transportation Efficiency (WA-Trans GIS Framework)" is being used as recommended by the Government Liaison at WSDOT. The goal is to get them to read them and so the information doesn't always fit the question in order to get them interested immediately.

The second request is for state funding. There are three different documents relating to that. The first is the CAG form the second is the Project Summary, and the third is the "white paper". The last two documents are a short form and long form of the Research Problem Statement for the Pooled Research Funding request.

While Tami can't change these documents, if there is feedback that she can use in future funding requests she would like it. Please let her know of any suggestions. These documents will not be appended to these notes but are available by request.

Review Data Standards Document

Tami identified that based on our previous meeting that a key goal of the Steering Committee for the next several meetings is developing three documents. These are:

- WA-Trans Data Standards,
- WA-Trans Architecture (see discussion of Architecture Outline)
- WA-Trans Policies, Processes and Organizations

A fourth document, WA-Trans Agreements would follow. Developing these documents first draft can be considered the completion to Phase I in order to move into pilot development and Phase II of the project. At that point the committee can look at meeting less often for shorter meetings and various members may become members of various Pilot Advisory Teams as appropriate.

WA-Trans DRAFT Conceptual Architecture

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Tami introduced Shawn Blaesing-Thompson, who is working on writing the WA-Trans Data Standards. Shawn is a cartographer in Tami's office and has very limited experience with something like this so she is seeking feedback. Suggestions included:

- Moving section 2.1 to the end of the document (References)
- Under data characteristics, section 3.0, it was recommended that that they should be raised from a "road" based level to a "transportation" level and then various modes be specified under that. Ex. road name changed to facility name and then a mode flag be added.
- It was suggested that the section regarding functional class be embellished and work be done to develop a crosswalk between various road classification systems.
- Under Section 4.1, Rules for Submission, references were made to "best available" data, and "facility ownership" as a key indicator of data provider. The need to identify attribute completeness, while defined in the accuracy, was identified here. Also the need for a metadata signoff was identified. Tami indicated that many of these items should be defined in the WA-Trans Policies, Processes and Organizations document. It was also suggested that we may need a "tickler" to support update frequency.
- Under section labeled 4.2 Data Standards a statement regarding the use of translators for re-projection and conversion for those not under the standard was requested.
- The section 5.3 called Additional Data Sets is to be deleted.
- The numbering on the sections is incorrect and will be revised.
- Shawn was given kudos for her effort on this standard!

Action Item – Tami put rules for submission and metadata standards on the agenda for the June 7 meeting.

The Draft Standards are Appendix A of this document.

The standards discussion leads to a discussion of ramp identification. Tami had an action item to find out how WSDOT identifies ramps. Tami checked with the Transportation Data Office and received the following information:

The RRT (Related Roadway Type) is a two character field and is either P, Q, R, or S followed by a 1 thru 9 (a few examples: P1, Q5, R2, S6)--A P ramp is an off ramp in the increasing direction of a route; Q is an on ramp in the increasing direction; R is an off ramp in the decreasing direction; S is a on ramp in the decreasing direction. An LX (another RRT) is the crossroad which the ramps connect to (example--005 LX10279 is Trosper Road in Tumwater). One note--ramps with a 5 (R5, P6) or higher designate loop ramps, usually associated with cloverleaf-like interchanges.

The RRQ (Related Roadway Qualifier) is a (up to) six character alpha and/or numeric description of the RRT. Ramp RRQ's are numeric and are associated with the State Route Milepost where the ramp tapers either on or off the main route (example--005 P110255 is an increasing off ramp which tapers from SR 5 at SRMP 102.55).

LX ramps are given the SRMP of the structure associated with them (Trosper Road is at SRMP 102.79 on SR 5).

This was seen as very complex, but as Tami and Art pointed out WSDOT has access to significant data related to this naming convention. There was a discussion regarding ramps and other possible nomenclature. Dave R. felt certain that counties have nomenclature as well. It was identified that ramps are important to many different business needs and we need to figure out a way to have various references to them.

WA-Trans DRAFT Conceptual Architecture

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We had a long discussion on functional class. Functional class is considered crucial. Must be transparent to counties and cities. We need to find out the various well-known classification systems and crosswalk them.

Action Item - Tami find out from city reps if there is a standard among cities regarding functional class.

Action Item – Sam will check on USGS Road Classification and bring information to the next meeting.

Review Conceptual Architecture Update

Tami provided an updated conceptual architecture. This document has changes suggested at the last meeting and attempts to deal with the fact that vertical integration may not be performed every time data updates are provided. The relationship between vertical integration and horizontal integration is difficult to illustrate at this level and it is thought that Roland's flow chart will provide detail to further understand this concept. Each process box of this document should have a detailed flowchart in the overall architecture to provide more refined detail. No changes were recommended. The conceptual architecture is Appendix B of these notes.

Review Update for Access for View and Download Description

Joe updated this document adding an informational button about metadata. However we need to define a way to select specific metadata from a download. Census may be developing a tool and Wendy is pursuing that, but until she has a response we can't be sure. It was decided to add an option for not downloading metadata. It needs to be an explicit process so the data user understands that WA-Trans is not responsible for incorrect assumptions made about the data as a result of not reviewing the metadata.

Joe had suggestion for handling clipping based upon municipal boundaries. Here is the outline of the suggestion:

If we gave each entity an initial boundary which included their UGA +/-, that will at least keep most changes within the box. Since we are giving our network an "ownership" code, it should be simple enough to color or line code the "city" roads different than the "county" roads. We could also provide the user the choice to view/download by boundary or by "ownership" within the box.

The group was very supportive of this idea. The updated Access for View and Download document is in Appendix C.

Action Item – Joe will incorporate these changes in his document prior to the June 7 meeting.

Review Core Attribution for Roads

Dave Rideout provided some proposed core attributes for roads. He decided to make some changes based upon Shawn's standards draft. He provided an alias field that allows for a list of aliases. He did not have the data model to compare to how the model handles aliasing. There was some question about speed limit and number of lanes. Last meeting it was suggested that these be added to the list and they weren't in the draft document. After some discussion Dave decided to add them. Another issue that may come up is who the source is for functional class. There was some uncertainty if ferry routes have a functional class. The draft core attribution for roads is in Appendix D of this document.

Action Item – Tami will send Dave the data model.

Action Item – Tami will find out if ferry routes have a functional class.

Action Item – Dave will update the proposed core attributes based upon input provided.

WA-Trans DRAFT Conceptual Architecture

April 15, 2004

WA-Trans Architectural Outline

Tami developed an outline of WA-Trans Architecture to fill in as a project deliverable. There was some discussion on browser software and concern that WA-Trans work for any standard browser configuration. That should be handled under the software configuration section. Many of the hardware configuration and server configuration will depend on WSDOT's environment and will not immediately be filled out. Under the software components section there is a place for a diagram (initially a flow chart) and high-level specifications for each piece of software to develop for WA-Trans. Also there are sections for inputs, outputs and identified users and user characteristics. This will use modified versions of the work already developed by the steering committee.

There were no proposed modifications to the architecture outline. Appendix E contains the proposed outline.

List of Processes to be defined

Tami outlined three document deliverables for the Steering Committee to work on. The last is the WA-Trans Policies, Processes and Organizations. She asked the group to develop a list of processes that need to be defined for this document. Tami added some to the list developed at the meeting. The list of processes is:

- Maintenance
 - Feedback on data and WA-Trans software,
 - Reminder process to data providers for updates,
 - Change control and change management,
 - Ongoing evaluation of data to feed the change process,
 - Monitoring use and usability.
- Vertical Integration
 - Deciding whose data to use,
 - Defining which attributes are required,
 - Decisions about conflation.
- Horizontal Integration
 - Process for developing and documenting agreement points.
- Communication
 - Ongoing,
 - Public Works and County Engineers,
 - Agreements.
- Data Stewardship
- Survey for pilots

Under the policy section it is anticipated the public data discussion and policy will be documented.

Next Meetings

The next several meetings were scheduled as follows:

- June 7, 2004 – WSDOT NW Region Office in Shoreline
- July 19, 2004 – WSDOT Eastern Region Office in Spokane
- September 13, 2004 – WSDOT HQ in Olympia
- October 25, 2004 – WSDOT NW Region Office in Shoreline

WA-Trans DRAFT Conceptual Architecture

April 15, 2004

Appendix A – DRAFT WA-Trans Data Standards

Data Standard Goals for WA-Trans

- Establish standards which enhance the will and ability of partners to collect and maintain the data
- Match the standard to the ability of the partners to collect and maintain data
- Identify a standard which allows data quality to improve over time – long term data maintenance and updates
- Identify funding incentives for partners to participate
- Standards need to recognize capabilities of existing technology and upgrade with technology improvements

Standards that will work in phases:

Meet most important business needs

Facilitate Data integration

Facilitate maintaining data long term

Data needs to be accurate, complete, non-complex, well documented, update cycle, relevant, digital, open standard format, import to digital mapping systems

Work thorough data model

Outline for Data Standards – Draft

1. Introduction

1.2 Goals of the Data Standards

The goals of the WA-Trans framework data standards are:

- To establish standards which enhance the will and ability of partners to collect and maintain the data
- Match the standard to the ability of the partners to collect and maintain data
- Identify a standard which allows data quality to improve over time – long term data maintenance and updates
- Identify funding incentives for partners to participate
- Standards need to recognize capabilities of existing technology and upgrade with technology improvements

1.3 Intended use description

The Purpose of the WA-Trans Data Standards is to set a set of common requirements for the collection and exchange of data layers from a variety of geographic sources (GIS, CAD, etc.) These layers will create a statewide set of data layers developed as a comprehensive transportation network.

1.4 Standard development Procedure

These standards were developed by the WA-Trans framework steering committee for the purpose of collecting and managing data for two pilot projects. These standards will be adjusted as necessary for as experience is gaining during these pilot projects.

WA-Trans DRAFT Conceptual Architecture

April 15, 2004

2 Scope

2.1 References

All Roads (HARP), ODT, Watterson and Brady, 2003 v5 draft
ANSIT, Geographic Information Framework-Data Content Standards for
Transportation Networks: Roads
Oregon Road Centerline Standard, ODT, V.2, 2003 draft
Michigan Framework – web
http://www.michigan.gov/cgi/0,1607,7-158-12759_14194---,00.html
Arizona Framework – web
Dueker white paper
King Co Standards
http://www.metrogis.org/data/standards/address_guidelines.shtml
Minnesota Data Standards
<http://www.co.clay.mn.us/Depts/GIS/GISDStan.htm>
WAGIC Metadata
http://wagic.wa.gov/techstds2/wl_subsetv1.htm
Geospatial One Stop
<http://www.geo-one-stop.gov/Standards/Base/index.html>

These will need to be cited as necessary

2.2 Definitions

Points -
Lines
Events

I expect there will be others as deemed necessary

2.3 Symbols and Abbreviations

ROW Right of Way
LRS Linear Reference System

Others as deemed necessary

Data Characteristics (Oregon Road Centerline data standard to be adjusted for WA-Trans.
Information for events placed on transportation features roads, rail etc.)

-Need to decide on mandatory, conditional and optional fields for data layers

3.1 Points

- Based on dynamic segmentation of roadways (using mileposts or distance from intersection), x,y coordinates from GPS, or geocoded addressing information.

| Field Name | Type | Width | Description |
|------------|--------|-------|--------------------------------|
| Shape | Point | 9 | Road Point placed by software |
| Unique-ID | Number | 15 | Framework ID from data steward |
| X-Coord | Number | 15 | Longitudinal Coordinate |
| Y-Coord | Number | 15 | Latitudinal Coordinate |
| Type | String | ? | Type of point event |

3.2 Lines

-Based on dynamic segmentation of roadways

| Field Name | Type | Width | Description |
|------------|--------|-------|---|
| Shape | Line | 9 | Order of coordinate pairs representing a road segment |
| Unique-ID | Number | 15 | Framework topological ID from data steward |

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| | | | |
|-----------------------|--------|----|---|
| F-Node | Number | 8 | From node: start point identifier for the road centerline |
| T-Node | Number | 8 | To Node: end point identifier for the road centerline |
| Local-ID | String | 11 | Local Road Centerline feature identifier |
| RdOwner | String | 50 | Entity responsible for maintenance of segment |
| RdNumber | String | 50 | Roadway ID number (002, 101) |
| Address | | | |
| Left low | Number | 10 | Left low address range |
| Left high | Number | 10 | Left high address range |
| Right low | Number | 10 | Right low address range |
| Right high | Number | 10 | Right high address range |
| Prefix direction | String | 3 | Suffix directional component of segment name |
| Street name | String | 50 | Road name |
| Street type | String | 3 | Road type (ex. ST, AVE, BLVD) component of seg. |
| name Suffix direction | String | 3 | Suffix directional component of segment name |
| Zone | String | 10 | Used with geocoding 0 usually zip code |

3.3 Other Data Fields

| | | | |
|-------------------|----------|-----|--|
| Recommended other | | | |
| Number of lanes | String/# | 2 | 2, 4, 6 multidirectional, two-lane... |
| Speed limit | String/# | 8/2 | Number unless multiple speeds posted? |
| Jurisdiction | String | 20 | County, city, State, Feds? (FIPSID) |
| Road Name | String | 50 | Long name |
| Function Class | String | 10 | Functional Class definition (urban rural...) |
| Pavement Type | String | 20 | (Asphalt, concrete...) |
| Alias Name | String | 50 | Alternate Road name |

3.4 Notes and Misc... to be filed later

I may be able to make some suggestions for ID fields to make querying out data by jurisdiction. More to come here.

There was some discussion regarding functional class. What is the relationship between functional class (Federal Highway Administration's road classifications) and Census CFC's based upon USGS Road classifications 1 –7 from trail to highway. We need to create a crosswalk for them. This may be part of the standards definition.

USGS Code – Federal, State, Paved, etc.

FHWA includes codes for different road types – e.g. 7 – 9: Rural codes; 13, 14, 15, 16, 17, 19 – Urban Codes from collector to major urban arterial.

Ramps

Other Core Attribution

 Bike

 Foot

 Ferries

 Aviation

 Railroad

Data reference points on the boundary layers where jurisdictions cross. Pseudo-nodes with jurisdictional ID.

Others as deemed necessary

WA-Trans DRAFT Conceptual Architecture

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4 Data Content

4.1 Rules for submission

Datasets must be topologically clean

All polygon boundaries should meet exactly.

Line and polygon features should be contiguous across coverage boundaries (i.e. where a single geographic feature is split into adjacent coverages or tiles, it should be edge-matched).

Every feature (point, arc, polygon, region, etc) should have one attribute record.

More information in this area although some of this will be handled when setting up the translator.

4.2 Data Standards

Sample Data Set Standards

Horizontal Datum: NAD 83/91

Vertical Datum: NGVD 88

Projection System: Lambert Conic Conformal

Coordinate System: WA State Plane Coordinates

Coordinate Zone: South

Coordinate Units: Feet or meters if NAD83/91

Accuracy Standard: replace with target table

Vector Import Format: .shp, .dgn, .dxf, .dwg, .mdb

Database format: .MDB (geodatabase), excel, .DBF, or .txt
(.CVS?), XML, .mls, .xls

Metadata: ISB required and optional

4.3 Metadata Standards

4.3.1 Basic List - Required

Basic information about the data set

Title, Publisher

Description

Abstract, Purpose

Time Period of Content

Range of Dates / Times

Beginning Date, Ending Date, Currentness Reference

Keywords

Theme

Theme Keyword

Place

Place Keyword

Data Quality Information

Lineage

Source Information, Source Time Period of Content

Range of Dates / Times

Beginning Date, Ending Date

Entity and Attribute Information

Overview Description, Entity and Attribute Overview

Point of Contact / Contact Information

Contact Person, Contact Organization, Contact Position, Contact Address

Address Type, Address, City, State or Province, Postal Code

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Contact Voice Telephone, Contact Facsimile Telephone, Contact Electronic Mail
Address

Plus a subset with bounding information, accuracy and coordinate information

4.3.2 Working Subset

- Status – Maintenance information for the data set
 - Progress – Complete, in progress, or planned
 - Frequency of updates
- Spatial Domain – geographic domain of dataset
- Bounding Coordinates
 - West, North, East, South
 - Theme, and Place Keywords
 - Access and Use Constraints
- Attribute Accuracy
 - Attribute Accuracy Report – explains the accuracy of the features
 - Positional Accuracy – Estimate of horizontal accuracy of spatial objects
- Vertical Position Accuracy
 - Vertical Positional Accuracy Report – Vertical accuracy
 - Source Scale
 - Source Contribution – info on contribution dataset
- Spatial Data Organization Information
 - Direct Spatial Reference Method
- Raster Object Information
- Spatial Reference Information
- Horizontal Coordinate System Definition
 - Planar
 - Grid Coordinate System
 - State Plane Coordinate System
 - Planar Coordinate Information – Distance Units
 - Geodetic Model
 - Horizontal Datum Name
 - Ellipsoid Name
 - Semi-major Axis
- Vertical Coordinate System Definition
- Altitude System Definition
- Depth System Definition
- Detail Description
- Entity Type-label and definition
- Attribute-label and definition
- Attribute Domain Value
- Enumerated Domain- value and definition
- Range Domain – Max and Min
- Code set Domain – Name, Source, Units of Measurement, Measurement resolution
- Citation Information-Originator, Publication Date, Title

3.6 Data Quality

3.6.1 Data Scale

This will be a multi-scale dataset

- 1:1200, 1:6000, 1:24000 Urban
- 1:6,000, 1:24,000, 1:48,000 Rural
- 1:24,000, 1:48,000, 1:100,000 Remote

3.6.2 Data Accuracy

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| | Urban | | Rural | | | Remote (ag/forestry) | | | |
|-------------------------------|-------------|------------|------------|-------------|------------|----------------------|-------------|------------|------------|
| | <i>High</i> | <i>Med</i> | <i>Low</i> | <i>High</i> | <i>Med</i> | <i>Low</i> | <i>High</i> | <i>Med</i> | <i>Low</i> |
| <i>Spatial Accuracy</i> | 1 ft. | 5 ft. | 40 ft | 5 ft | 40 ft | 50 ft | 40 ft. | 50 ft. | 100 ft |
| <i>Update Frequency</i> | 1 mos. | 6 mos. | 1 yr. | 1 yr. | 2 yrs. | 3 yrs. | 1 yr. | 2 yrs. | 5 yrs. |
| <i>Attribute Completeness</i> | 95% | 80% | 70% | 95% | 80% | 70% | N/A | N/A | N/A |
| <i>Source</i> | | | | | | | | | |
| <i>Scale</i> | 1:1200 | 1:6000 | 1:24 K | 1:6000 | 1:24 K | 1:48 K | 1:24K | 1:48K | 1:100K |

4 Stewardship

4.1 Update Cycles

Need decisions on best available data for each data layer and/or scale.

Here data could be submitted to source agency when concatenating with tabular or spatial data. If this is acceptable this would reduce the need to concatenate data repeatedly with each update cycle.

Also will need to define a regular update cycle for data. Many agencies have an annual update cycle based on budget cycle. Would this dictate framework update cycle?

Yearly updates, quarterly?

4.2 Data Storage Agreements

Data will be available for distribution by

5 Data Layers

5.1 Core Data Sets:

State Highway

Highway Ramps – WSDOT naming convention

Milepost

Scenic Roads - attribute

Local Roads

Bridges, culverts – attribute (event), eventually BEarms for bridge

Railroads

Ferry Transit Routes – include ferry terminal locations, includes staging areas as segments and connector roads

Aviation Routes – includes airport locations, connector roads and runway segments

5.2 Reference (Boundary) Datasets:

County Boundaries

Reservation Boundaries

City boundaries – too dynamic?

5.3 Additional Datasets:

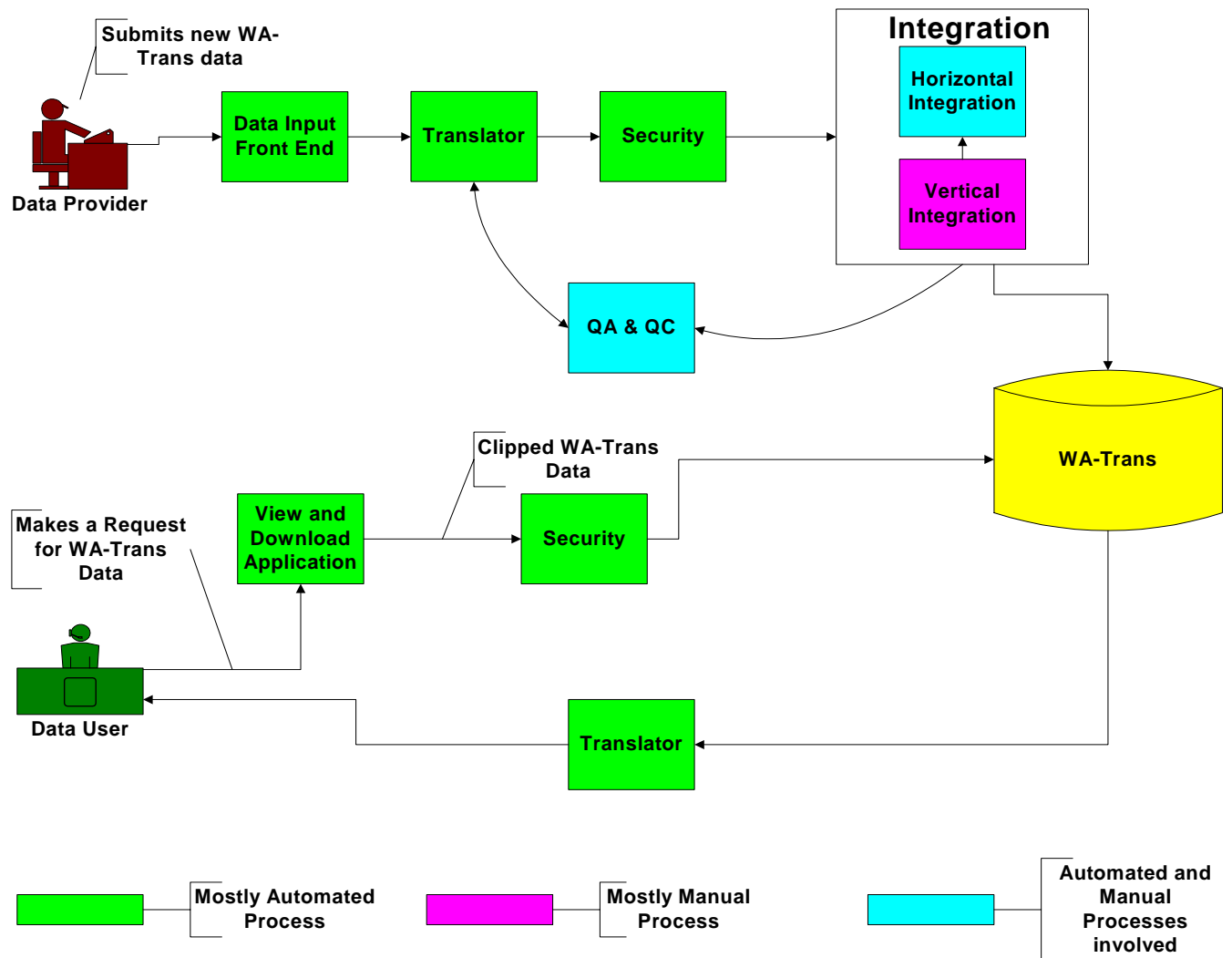
CRIS Data – Core attribution

Survey Data – Core attribution

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Appendix B – WA-Trans Conceptual Architecture 4-15-04



Access for Viewing/Downloading Files

Appendix C – Access for Viewing/Downloading Files

General

A web portal will be established to list the agency's core data sets as well as additional supportive layers for background and reference. Mapping functions will be available for both navigation and identification of data sets and layers.

Structure

The website will be composed of the following pages:

- Framework overview
- Web portal page
- Data Sets for Downloading
- Disclaimers/Release of liability to be read before accessing mapping and data sets for downloading
- Resource links for other framework and supporting data layer sets

Viewing

The following data sets are examples of what may be included in the interactive web page. Core Transportation layers and metadata files will be available for distribution through the web portal. *A metadata button will appear on the opening statewide view screen. It will give the minimum attributes available and the minimum accuracy standards for the various data in Framework, along with a statement that some data may be available with additional attributes and higher accuracy. (These areas could be color coded for easier identification by the viewer/user. Clicking on an area could bring up that metadata.)* Transportation Framework will provide links to the originating agency's website for downloading or accessing of data sets belonging to other agencies or entities. Metadata for those data sets would be the responsibility of the provider.

Core Data Sets

1. Federal
2. State Highway system
3. Highway Ramps
4. Mileposts
5. Rest Areas
6. Scenic Highways
7. Local Roads
8. Bridges
9. Railroads
10. Ferry Transit Routes
11. Aviation Routes
12. Priority Programming
13. Engineering and Maintenance Districts
14. Organization Boundaries

Reference Data Sets

1. County Boundaries
2. Urbanized Areas
3. Reservation boundaries

Additional Data Sets for Download/Access

1. Cris Data (Mobility?)
2. Survey Data

Access for Viewing/Downloading Files

Map functions to be made available:

- Zoom in/out
- Full view
- Pan
- Search by:
 - Location (regional, county or city)
 - Identifiers (street names or intersections)
 - Jurisdictional agency (federal, state or local authority)
- Query Data
- Export Data by
 - Selection
 - Data set name
 - All Data Sets shown

Access for Download

Download of the data will be available both through the web map page by selecting the data to be downloaded from the map or through a link to a web page that enables a direct download of the original data set. The second option will be a traditional resource page that lists the data sets available by description, format and location. Downloading complete data sets through a traditional access page in tabular format will provide services for clients that may not have adequate internet access to support access of the interactive web page. These data sets would be available based upon their geographic extents, e.g. by state, county or regionally significant areas.

Formats

Formats to be made available for Download/Access

1. Shape files, ArcGIS feature data sets for ArcSDE, .dxf or .dgn,
2. .MDB, Excel, DBF, .txt,
3. JPEG, TIFF, bmp or GIF
4. Projection- Washington State Plane South NAD 83 only. (.PRJ files to be provided with shape files)

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Appendix D –

WA-Trans

Proposed core attributes

First Draft – April 15, 2004

Primarily from 5th draft of Oregon Road Data Standard, with some CRIS attributes added.

| ITEM NAME | TYPE | | WIDTH | Description |
|---------------|--------|-------|-------|--|
| LENGTH | Number | 16 | | Calculated length in US Survey Foot |
| RDOWNER | String | ? | | Entity responsible for maintenance of segment |
| RDNAME | String | 72 | | Concatenated segment name |
| DIR | String | 2 | | Prefix direction (N,S,E,W,etc.) |
| NAME | String | 64 | | Road name |
| TYPE | String | 3 | | Type (St, Ave, Ct, etc.) |
| SUFF | String | 2 | | Suffix component |
| ALIASLIST | String | 200+? | | Alias list separated by ‘;’ Keywords and AKA’s |
| FROMLEFT | Number | 10 | | Left low address range |
| TOLEFT | Number | 10 | | Left high address range |
| FROMRIGHT | Number | 10 | | Right low address range |
| TORIGHT | Number | 10 | | Right high address range |
| ZONELEFT | String | 16?? | | Area descriptor, left side (could be ZIP) |
| ZONERIGHT | String | 16?? | | Area descriptor, right side (could be ZIP) |
| FROMMILEPOST | Number | 6 | | Beginning Milepost |
| TOMILEPOST | Number | 6 | | Ending Milepost |
| LCITY | String | 32 | | City on left side of segment |
| RCITY | String | 32 | | City on right side of segment |
| COUNTY | Number | 2 | | County code for segment |
| FUNCTIONCLASS | Number | 2 | | Function Class assigned by RDOWNER |
| PAVEMENTTYPE | String | 1 | | Pavement Type assigned by RDOWNER |
| S_DATE_MOD | Date | 8 | | Date of last modification to geometry |

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Appendix E – WA-Trans Architectural Outline Draft

Project Background

- Brief description of the project goals, needs and constraints and how these are driving the architecture.

Overall Conceptual Architecture

- Illustration showing how the architecture fits together.
- Description of the components (very brief) and how they fit together.

Software Configuration

- Software developed under.
- Browser(s).
- Workstation Operating System(s).
- Server software
 - Internet
 - Application
 - Database
- Server Operating System(s).
- Database System.

Hardware Configuration

- Minimum configuration – data provider.
- Minimum configuration – data user.
- Server configuration
 - Internet
 - Application
 - Database
- Network requirements.

Software Components

- Data Input Front End
 - Diagram (Flow Chart and/or UML)
 - High Level Specification Description
 - Inputs
 - Outputs
 - Identified Users and User Characteristics
- Translator
 - Diagram (Flow Chart and/or UML)
 - High Level Specification Description
 - Inputs
 - Outputs
 - Identified Users and User Characteristics
- Security
 - Diagram (Flow Chart and/or UML)
 - High Level Specification Description
 - Inputs
 - Outputs
 - Identified Users and User Characteristics
- Horizontal Integration
 - Diagram (Flow Chart and/or UML)
 - High Level Specification Description
 - Inputs

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- Outputs
 - Identified Users and User Characteristics
- QA/QC
 - Diagram (Flow Chart and/or UML)
 - High Level Specification Description
 - Inputs
 - Outputs
 - Identified Users and User Characteristics
- View and Download
 - Diagram (Flow Chart and/or UML)
 - High Level Specification Description
 - Inputs
 - Outputs
 - Identified Users and User Characteristics

References

- WA-Trans Data Model
- WA-Trans Data Standards
- WA-Trans Policies, Processes, and Organizations
- WA-Trans Agreements

Action Items

| WA-Trans Steering Committee Action Items List | | | |
|---|---|--|-----------------------------|
| What | Who | When | Status |
| Send Tami info about time lost due to video-conferencing snafus. | Dave R. | ASAP | Assigned |
| Put "Rules for data submission" & "metadata standards" on the agenda for June 7 | Tami | June 1, 2004 | Assigned |
| Find out from city reps if there is a standard among cities regarding functional class of roads. | Tami | June 1, 2004 | Assigned |
| Get information on USGS Road Classification System for next meeting | Sam | June 1, 2004 | Assigned |
| Incorporate agreed to changes into the Access for Viewing/Downloading document | Joe | June 1, 2004 | Assigned |
| Send Dave R. the data model | Tami | ASAP | Complete |
| Find out if Ferry Routes have functional class. | Tami | ASAP | Complete |
| Update proposed core road attributes based upon input provided | Dave R. | June 1, 2004 | Assigned |
| Schedule meetings and video-conferencing as agreed | Tami | ASAP | Assigned |
| <i>Send Tami comparison of different metadata</i> | <i>Wendy</i> | <i>April 20, 2004</i> | <i>In Process</i> |
| <i>Check to see if Census has or plans to have tools for metadata.</i> | <i>Wendy</i> | <i>April 12</i> | <i>Waiting for response</i> |
| <i>Develop high-level specifications of front-end for data submission</i> | <i>Tony</i> | <i>April 12</i> | <i>Assigned</i> |
| <i>Set up meetings with various non-road transportation mode data experts to determine core attribution for them.</i> | <i>Tami</i> | <i>April 19</i> | <i>Assigned</i> |
| <i>Attend the meetings with Tami and help develop core attribution for the assigned modes: Bike, Foot - Jerry (no meeting) Ferries - Jerry,</i> | <i>Tami, Jerry, Roland, Dave Cullom</i> | <i>After Tami sets up the meetings</i> | <i>Assigned</i> |

Note: *Italicized items are prior to December 8, 2003 Meeting but are still outstanding unless otherwise stated. Colored items are critical to other things being completed and should be looked at as high priority.*

Date: 8/11/2005

| WA-Trans Steering Committee Action Items List | | | |
|--|-----------------------|--|--|
| What | Who | When | Status |
| <i>Aviation – Roland, Railroad – Dave Cullom</i> | | | |
| <i>Write letters supporting WA-Trans and funding of WA-Trans on letterhead of their organizations</i> | <i>All SC Members</i> | <i>ASAP!!! – February 6 would be best!</i> | <i>PSRC, Community Transit, WUTC, Pierce County are complete</i> |
| <i>Update Accuracy in Business Needs Matrix and send to Tami</i> | <i>Dave Wolfer</i> | <i>February 27, 2004</i> | <i>In Process</i> |
| <i>Make changes outlined in notes to Security Utilities Draft for WA-Trans</i> | <i>Ian Von Essen</i> | <i>February 27, 2004</i> | <i>Complete</i> |
| <i>Follow up with WSDOT regarding servers and hosting WA-Trans</i> | <i>Tami</i> | <i>Long term effort</i> | <i>In process</i> |
| <i>Discuss how the Map application Chuck wrote for WA-Trans web application can be used to show project progress and where it should be served from.</i> | <i>Tami and Chuck</i> | <i>ASAP</i> | <i>In Process</i> |
| <i>Meet with the WSDOT assistant Attorney General to discuss this issue and get guidance on what our options are.</i> | <i>Tami</i> | <i>When completed with Tier 2 description and issues</i> | <i>Assigned</i> |
| <i>Turn WA-Trans into Census to provide us with quarterly extracts of survey data.</i> | <i>Wendy H.</i> | <i>ASAP</i> | <i>On-going – update coming around April 20</i> |
| <i>Provide results from CRAB survey to WA-Trans.</i> | <i>Dan</i> | <i>When completed</i> | <i>In Process</i> |
| <i>Work with Nick Marquardt, PSRC, and TNM to develop scope of pilot project.</i> | <i>Tami, Jerry</i> | <i>ASAP</i> | <i>In process</i> |

Note: *Italicized items are prior to December 8, 2003 Meeting but are still outstanding unless otherwise stated. Colored items are critical to other things being completed and should be looked at as high priority.*

Date: 8/11/2005

Note: *Italicized items are prior to December 8, 2003 Meeting but are still outstanding unless otherwise stated. Colored items are critical to other things being completed and should be looked at as high priority.*

Date: 8/11/2005

Tami's Status Report Steering Committee Meeting April 19, 2004

I have been working on completing funding requests, and selling the concept of WA-Trans in as many places as possible since we met last. There seems to be some real synergy resulting from these varied efforts.

I completed three funding requests. The first is for a Federal Earmark. There are several "versions" that must be completed because each Senator and House Member has their own "version" and keeping it brief is critical. I am also forwarding off scanned copies of the letters I receive with these requests. I am going to continue to do that as long as they will let me so keep 'em coming!

The second request is for state funding through the legislative process called "decision packages". WSDOT is in the process of deciding which will actually go to the legislature. Frequently things that don't go to the legislature still get funded if they get executive support. They were prioritized at a middle-management level (more of a what-is-in-it-for-me) sort of outcome and we didn't do really well. But all of them are now going to the top executives and will have another chance. I am also sending letters with those requests.

The third is the pooled research proposal. I got that finished and turned in last week and am in the process of making changes recommended by our Research Director. It is important that this request show value to multiple states so that may influence how it is done. I am going to bring these proposals to the meeting so you can see what I have been doing.

I met with the Transportation Data Office and members from a committee at the State trying to determine how to implement the NHTSA recommendations that I mentioned in the last status report. They are interested in WA-Trans to provide a statewide LRS. However, they are also interested in implementing a system using handheld devices for all law enforcement officers statewide to more correctly identify accident locations. They need a statewide base map and a common names file for this effort. Chris Madille, from the Washington State Patrol and I are going to be working together on a presentation for the group in early May.

I met with Elizabeth Robbins, the head of the Washington Transportation Plan, which is updated every 5 years and uses data from many locations to inform her about WA-Trans. This was a very productive meeting and an opportunity to show WSDOT another value of WA-Trans for the agency.

I am scheduled to give a presentation to the Geographic Information Technology subcommittee of the Information Services Board (ISB) in late May or early June. This group recommends policy to the ISB, which sets IT policy for all state agencies. If we are to find a method of funding WA-Trans without making every agency take some money out of their budget this group can figure out how to do it. The presentation will show the value of WA-Trans to critical applications state agencies are working on or considering. I would like other state agency steering committee members to try to attend and assist me so we can show a cross section of commitment.

I attended the recent WA URISA conference in Tukwila. What a great conference! I presented an update on WA-Trans along with Sam Bardelson and Wendy Hawley. Several partners and steering committee members also gave excellent presentations. I was pleased to note that in two presentations local governments mentioned partnership and/or participation in WA-Trans! That will help us interest other participants! Thanks!!

I am planning on attending the Central Washington GIS Users Group meeting this week in Wenatchee. I will be bringing my table top display and setting it up.

Our next meeting is June 7 from 9 a.m. to 2 p.m. in Shoreline at the NW Region Transportation Building on Dayton Avenue. Video-conferencing will be available. I also hope to provide lunch if you can bring some money. I will let you know in advance.

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Attendees:

| Member | Association | Representing |
|---------------|--|---|
| Sam Bardelson | US Geological Survey Washington Liaison | The National Map |
| Roland Behee | Community Transit | Transit Organizations |
| Art Shaffer | WSDOT NW Region Maintenance & Ops | Alternate WSDOT |
| Chuck Buzzard | Pierce County GIS | West side local government |
| Dave Cullom | Washington Utilities and Transportation Commission | Pipelines, Utilities, Railroad |
| Tony Hartrich | Quinault Indian Nation | Quinault Indian Nation |
| Joe Bowles | Walla Walla County Surveyor | East side local government |
| Tami Griffin | WSDOT Geographic Services | WA-Trans (Project Manager), Facilitator |
| Wendy Hawley | Census Bureau | US Bureau of Census |
| Dave Rideout | Spokane County Engineers Office | Spokane County |
| Ian Von Essen | Spokane County GIS | E-911 |

Not Attending:

| Member | Association | Representing |
|-------------------|---|--------------------|
| Gloria Skinner | WSDOT Office of Freight Strategy and Policy | Freight Interests |
| Emily Terrell | City of Auburn Public Works | City Governments |
| Dan Dickson | CRAB | CRAB |
| Jerry Harless | Puget Sound Regional Council | MPO's, RTPO's |
| Dave Wolfer | WA Department of Natural Resources | WADNR |
| Jennifer Sorensen | Lummi Planning Department | The Lummi Nation |
| Terry Strandberg | Tulalip Tribes Community Planning Office | The Tulalip Tribes |

- Introductions, Status Questions, Action Item Review
- Review draft description of "Universal Translator"
- Review draft description of "Integration Software"
- Review draft questionnaire for pilots
- ~~Review draft description of "Security for WA-Trans"~~
- Review QA/QC draft description
- Core Attribution
- Standards Outline
- Vertical Integration business drivers
- Action items review & closing

Introductions and Review Action Items

- Tami sent a status report out prior to the meeting.
- Dave Rideout commented on the positives of the National Highway Transportation Safety Administration's finding that WSDOT Traffic Records process needed a statewide LRS of all roads.
- Tami reminded the group that she needed letters. She is working on three funding requests, one through the state, one through the federal earmark process at WSDOT and one through research funding at WSDOT with ODOT. The letters will make a big difference. Joe mentioned that once they ask for the letters they have to share with their local governments in more detail what they are doing and that makes it more complicated.
- Wendy will e-mail Tami the metadata cross-reference.

Review draft description of "Universal Translator"

Chuck had great concerns about suggesting at this point that we will use GML or XML for the translator. He felt we want to take advantage of the knowledge base that exists. He has not seen XML to be useful in production environments. There is concern with relying on an ESRI solution for our non-ESRI data

WA-Trans Project Meeting Notes
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providers. But whatever is developed must be supported. When we start working with the University we need to make sure that we end up with something we can support. Dave Cullom shared that when he worked on the pipeline project they had a consultant that proposed a data distribution method using XML. The decided to go with an ESRI solution because XML caused problems with field types.

Action Items – Tami – Constrain agreements with University’s contributor and others during pilots to make sure what ever is developed is maintainable.

Jerry – change diagram to remove the expectation of an XML or GML solution.

Tami asked for a specific scope for what we translate from and into. The following were agreed upon: *.shp, *.dgn, *.dxf, *.dwg, geodatabase (mdd).

Review draft description of “Integration Software”

Roland shared the changes he made and the diagram of data integration processes. A lot will be refined through a pilot. Vertical integration is assumed not to be required regularly once we get into a maintenance mode. Vertical integration is deciding between data availability. Roland also identified that Oregon has decided that the data provider will do attribute conflation. So it may be an external process.

Chuck identified Roland’s work as a good start and well thought out. Later we will discuss some business rules to guide the vertical integration process.

Review draft questionnaire for pilots

The updated draft was reviewed and approved as is.

Review QA/QC draft description

There were different types of specifications identified, some which lend themselves well to automation and some that do not. These include:

- Topological – automated. The GIS environment should handle this.
- Scale/Spatial – evaluation may not be able to be automated. Likely a manual process.
- Attribution – automated. This should be a function of translation. May still need some evaluation.
- Metadata – automation and evaluation both required.

The discussion of metadata lead to a discussion of data submission and downloading:

It was suggested that there needs to be a data submission form that allows the data provider to update metadata and click and okay box to put the burden regarding metadata on the provider to submit it.

Action Item – Wendy will check to see if Census has tools or plans on tools for metadata.

Tony – develop high-level specifications (description) of front end for data submission.

There was also a discussion to how we handle reporting problems identified by users. The decision was to notify and report the problem to the original data providers. The contributor needs a report back from WA-Trans regarding the disposition of the problem. We need a process where people using the data run into cross-jurisdictional areas. We will handle that later.

Roland shared that he participates on a “poor mans framework” that transit agencies have. It is a regional data set. Written into the inter-governmental agreement that a data provider has 2 weeks to correct or provide a correction and it’s process.

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It was identified that the access for download and view may be a good place to provide feedback to data providers. Must have meta-data associated with streets. If we download a lot of data we may get a lot of metadata. Does WA-Trans maintain an overarching meta-data? It was suggested that we use contributor ID on segment to get provider and provide feedback. This is supported in the data model.

Action Item – **Joe** will update the Access for Download and View with the suggestions regarding feedback and metadata.

Core Attribution

Dave Rideout went through the CRIS attributes that Spokane County uses and identified items he felt we might need. Then there was some discussion about these. Here was what was decided:

Event analysis

- Road #
- From_Milepost
- To_Milepost
- Name

Other

- Road Name
- Function Class
- Pavement Type

Address

- Left low
- Left high
- Right low
- Right high
- Suffix direction
- Street type
- Street name
- Prefix direction
- Direction

Recommended other

- Number of lanes
- Speed limit
- Jurisdiction –

There was some discussion regarding functional class. What is the relationship between functional class (Federal Highway Administration's road classifications) and Census CFC's based upon USGS Road classifications 1 –7 from trail to highway. We need to create a crosswalk for them. This may be part of the standards definition.

USGS Code – Federal, State, Paved, etc.

FHWA includes codes for different road types – e.g. 7 – 9: Rural codes; 13, 14, 15, 16, 17, 19 – Urban Codes from collector to major urban arterial.

We are going to need a way to designate private roads.

Action Item – **Dave Rideout** will develop a spreadsheet of these attributes identifying data types and sizes for review next meeting.

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Action Items - We need to determine core attribution for other modes of transportation. **Tami** will set up meetings within the next couple of months with various modes for this. The following will work on attending these meetings and helping Tami draft core attribution:

Bike – **Jerry** (no meeting unless Jerry knows of some expertise on this data)

Foot – **Jerry** (no meeting unless Jerry knows of some expertise on this data)

Ferries – **Jerry, Tami**

Aviation – **Roland, Tami**

Railroad – **Dave Cullom, Tami**

Standards Outline

Shawn Blaessing-Thompson developed an outline from steering committee notes and other documents. Review of the document produced this feedback:

- Vertical Datum is NGVD 88.
- Vector Input format defined earlier in these notes. Please use those.
- Add to database format XML and .xls. Database format could also be identified as attribution.
- Metadata – ISB required and option.
Action Item - At the next meeting we will determine that is required based on Wendy's comparison.
- Ramps – need to identify WSDOT naming convention.
Action Item – Tami will ask Mark at her office about ramps naming. There is a database on ramps. ID# 20 characters long. This could be an issue.
- Bridges and culverts – eventually we would like them to be segmented the bridge at the beginning and end, but right now they can be events.
- Aviation – airport location, runway segments, connector road
- Boundaries – disclaimer on boundaries as they change regularly and we may not always have the latest. Boundaries will include county and reservations. City is questionable due to the rate of change but for now include them. The jurisdiction code will have to change every time we get a new boundary. That is a big maintenance issue.
Action Item – To discuss next meeting – do we want counties submitting city data?
- There were more comments and Tami will put them in the standards outline and provide to Shawn. The goal is to have a first draft complete by the April 19 meeting.

It was agreed that the standards document needs to stop at the translator section. We need three separate documents. They are: Data Standards, Architecture (IT), Processes – manual, data sharing agreements, change management for long-term maintenance. These can provide guidance to pilots and information on what WA-Trans is to others.

Tami provided her conceptual architecture diagram for feedback. Vertical is spelled incorrectly. Other items will be updated based on changes to the process.

Action Items – **Tami** will update conceptual architecture based upon input provided.

Vertical Integration Business Drivers

The goal is to build a laundry list of guiding principals for those doing vertical integration:

Scale – must meet business needs

Attribution –

Ownership – Oregon used that as first option for submitting.

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Then we look at quality of data. It depends on where the data is from and what it is for. We need to develop a set of critical matrix with urban, rural and ag/forest data. We need to define which attributes are required and which attributes we are going to accept a percentage of completeness.

An example provided of the issue is Lincoln County in which the data has good spatial accuracy but no addresses.

Value – assuming we can conflate attribution. The first cut of who is responsible is the jurisdiction. If another agency has better data and the “data stewards group” agrees it is better data then we need to consider using it. Most agencies know who has better data.

Walla Walla County has GPS roads and orthophotos to make them work together as one. They are putting their attribution on the orthophoto data. Which data do we need? Probably the orthophoto based.

Dave Rideout expressed a real concern that the engineering or public works section be the ultimate authority. He feels that we need to contact the GIS people and the public works people. The county engineer should be included. We must maintain a good relationship with the county engineer. We need periodic communication between the framework and the county engineers as a general practice.

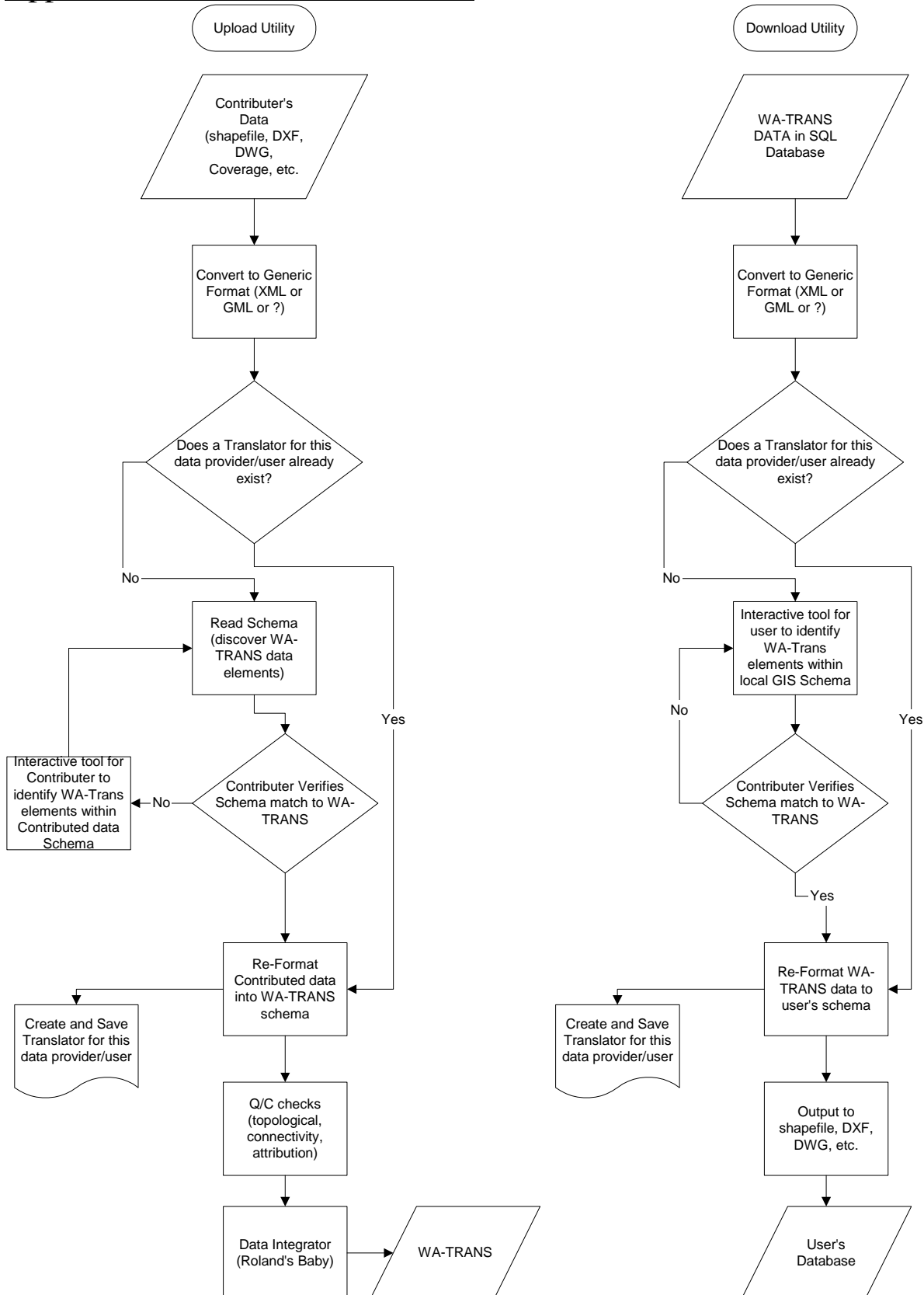
Action Item Review, Closing

Action Item – Tami will send out latest version of Oregon data model.

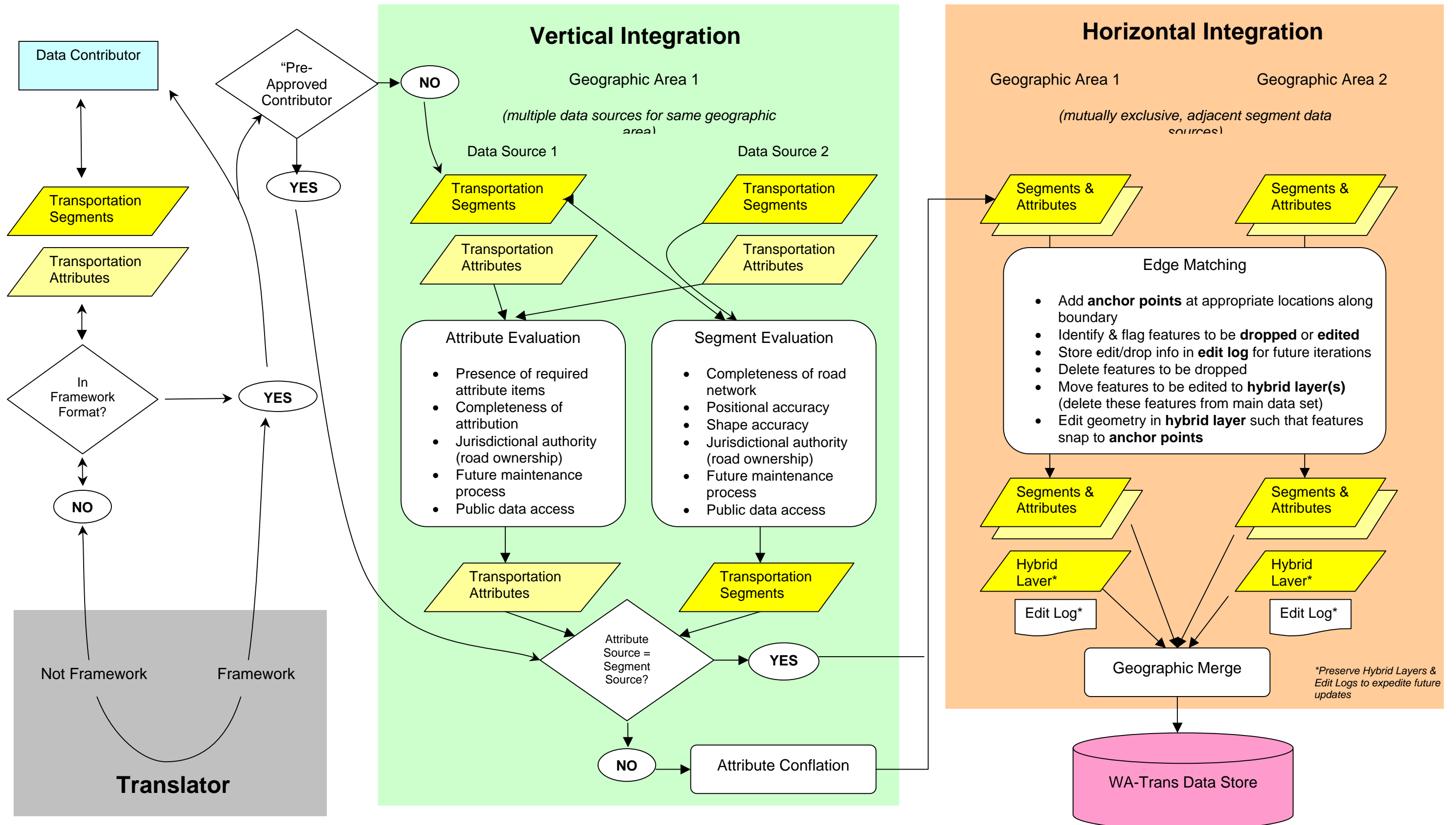
The next meeting will be held in Olympia on April 19 in the WSDOT Headquarters Building at 310 Maple Park SE from 9 a.m. – 2 p.m.; Room 2F22. Please bring between \$5.00 and \$10.00 for lunch and we will order sandwiches or salads from Meconi's. I will bring a menu and we will order during the break.

WA-Trans Project Meeting Notes
March 8, 2004

Appendix A – Universal Translator



WA-Trans Data Integration Conceptual Diagram



*WA-Trans Project Meeting Notes
December 8, 2003*

Appendix C – WA-Trans Pilot Questionnaire

WATRANS Pilot Questionnaire

Congratulations on your participation in the Washington Transportation Framework Pilot project. Your results will help establish the content, schedule, activities and work for the WATRANS project. Your results will also help other agencies understand the work effort required and will enable agencies to optimize their work based on your “lessons learned”. Please take the time to complete this questionnaire which will be used to communicate your progress and results to the team.

| | | |
|-----------|--|--|
| 1. | Agency Name | |
| 1.a | Pilot Project Contact | |
| 1.b | Pilot Project Phone and Email | |
| 2. | GIS Size and Content of Pilot | |
| 2.a | Size of roads dataset (MB) | |
| 2.b | Number of road segments | |
| 2.c | Size of other transportation datasets (rail, ferry) | |
| 2.d | What is the pilot's geographic area (city, county, state, etc) | |
| 2.e | Data Source | |
| 3. | Pilot Project Scope | |
| 3.a | Pilot project description how did you use the framework | |
| 3.b | Pilot costs – please describe the general costs associated with your project in terms of data, software, hardware and staff time | |
| 3.c | Pilot result What final product was produced (data, analysis, map) | |
| 4. | Pilot Database | |
| 4.a | Did you use the WATRANS database structure? | |
| 4.b | What problems did you find with the database content or structure | |
| 4.c | Did you have to make changes to the database to produce your result | |
| 4.d | What are your recommendations with regard to the WATRANS database | |
| 4.e | What DBMS system was used (SQL server, Oracle, etc) | |
| 5. | Pilot Software | |
| 5.a | What GIS software products or processes did you use for your pilot | |
| 5.b | Did you perform any GIS analysis and if so what did you do | |
| 5.c | Did you develop any software tools or processes that work with the WATRANS database, if so please describe | |
| 5.d | What was hardware platform and OS used for the pilot | |
| 6. | Data Translator | |
| 6.a | Did the translator work correctly | |
| 7. | Pilot Conclusion | |
| 7.a | What were your lessons learned during this pilot project (this could include data, software, hardware, project management) | |

WA-Trans Project Meeting Notes
December 8, 2003

Appendix D – WA-Trans Standards Outline

Summary of County Road Inventory System fields

| Relied on by GIS | Field # (1987) | Field # (2003) | Length | Description | Full field name | Required? | Additional info |
|----------------------------|-------------------|-------------------|--------|----------------------|------------------------------|--------------------------|--|
| | 1 | 1 | 2 | County number | COUNTY | Unknown | 1 thru 39 Alphabetical list of Wash. Counties |
| X | 2 | 0.1 | 5 | Road number | ROAD.NUMBER | Yes | Unique five-digit road number assigned by county |
| X | 3 | 0.2 | 6 | Beginning milepost | FROM.MILEPOST | Yes | starting milepost coded XX.XX with implied decimal |
| X | 4 | 0.3 | 6 | Ending milepost | TO.MILEPOST | Yes | ending milepost coded XX.XX with implied decimal |
| X | 5 | ? | ? | Road name | NAME | Yes | predominant road name, or whatever information the Co. Engr wants on the file to identify the segment, max 26 char |
| X | 6 | 2 | 2 | Functional Class | FUNCTION.CLASS | Yes | 0,7,8,9,13,14,15,16,17,19 |
| | 7 | 3 | 4 | Federal Route | FEDERAL.ROUTE | FUNCTION.CLASS dependent | assigned Federal Aid route number |
| | | 4 | 3 | | FUNCTION.CLASS.LOCAL | | |
| | 8 | 5 | 2 | Urban area number | URBAN.AREA | Yes | 1-32 or 99 |
| | 9 | 6 | 2 | Adjacent land use | ADJACENT.LAND | Optional | codes for fed/state/local agency controlling surrounding ROW |
| | 10 | 20 | 1 | Jurisdiction | JURISDICTION/TRAVEL.CATEGORY | Yes | 0,5,6,7,8,9 |
| | 11 | 10 | 1 | Shoulder type | SHOULDER.TYPE | Optional | 1,2,3,4,5 |
| | 12 | 8 | 2 | Left shoulder width | LEFT.SHOULDER.WIDTH | Yes | to nearest foot |
| | 13 | 9 | 2 | Right shoulder width | RIGHT.SHOULDER.WIDTH | Yes | to nearest foot |
| | 14 | 12 | 1 | Median type | MEDIAN.TYPE | Optional | 1,2,3,4,5 |
| | 15 | 11 | 2 | Median width | MEDIAN.WIDTH | Optional | to nearest foot |
| X | 16 | 13 | 2 | Pavement width | PAVEMENT.WIDTH | Yes | to nearest foot (travelled roadway) |
| X | 17 | 14 | 1 | Pavement type | PAVEMENT.TYPE | Yes | B,C,E,F,I,J,K |
| (in "Centerline" program") | 18 | 15 | 2 | Pavement rating year | PAVEMENT.RATING | Optional | last 2 digits of the year when major work will be required to maintain the roadway surface |

WA-Trans Project Meeting Notes
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| | | | | | | |
|----|----|---|------------------------|--------------------------------|----------|---|
| 19 | 16 | 2 | Number of lanes | LANES | Yes | combined number of lanes for both directions (not including short lengths of turning lanes, climbing lanes, etc.) |
| 20 | 17 | 5 | Traffic volume | ADT.VOLUME | Yes | Average daily traffic (required) |
| 21 | 18 | 1 | Traffic volume source | ADT.SOURCE | Yes | 0,1,2,3,4 |
| 22 | 19 | 2 | Traffic volume year | ADT.YEAR | Yes | last two digits of year |
| 23 | 7 | 2 | Jurisdiction detail | JURIS.DETAIL/MAINTAINED. BY | Optional | 0-90 |
| 24 | 21 | 1 | Special system code | SPECIAL.SYSTEM | Optional | 0,1,2,3,4,5,6,7,8 |
| 25 | 22 | 1 | Access control code | ACCESS.CONTROL | Optional | 1,2,3,4 |
| 26 | 23 | 1 | School/mail route code | SCHOOL.MAIL | Optional | 0,1,2,3 |
| 27 | 24 | 1 | Commissioner district | DISTRICT.COMM | Optional | optional single character |
| 28 | 25 | 2 | Subdistrict | DISTRICT.SUB | Optional | optional 1 or 2 digit character |
| 29 | 26 | 3 | Legislative district | DISTRICT.LEGIS | Optional | optional |
| 30 | 27 | 1 | Curbs code | CURBS | Optional | 0,1,2,3 |
| 31 | 28 | 1 | Sidewalks code | SIDEWALKS | Optional | 1,2,3 |
| 32 | 29 | 3 | Right of way width | RIGHT.OF.WAY | Optional | optional nearest foot, or "X" or "P" |
| 33 | 30 | 1 | Drainage code | DRAINAGE | Optional | 1,2,3,4,5,6,7 |
| 34 | 31 | 1 | Widening code | WIDENING | Optional | 1,2,3,4,5,6 |
| 35 | 32 | 1 | Area development code | AREA.DEVELOPMENT | Optional | 1,2,3,4,5,6 |
| 36 | 33 | 2 | Equivalent accidents | EQUIV.ACCID | Optional | formula for showing high density accident areas (prop+6*injury+25*fatal / 2yrs * length) |
| 37 | 34 | 1 | Bicycle lane - left | LEFT.BICYCLE | Optional | 0,1,2,3,4,5,6 |
| 38 | 35 | 1 | Bicycle lane - right | RIGHT.BICYCLE | Optional | 0,1,2,3,4,5,6 |
| | 36 | 4 | | TRUCK.ROUTE.CLASS | | |
| 39 | 37 | 2 | Replacement Category | REPLACEMENT.CATEGORY | | Calculated from Urban/Function/Pavetype |
| 40 | 38 | 2 | Maintenance Category | MAINTENANCE.CATEGORY | | Calculated from Urban/Function/Pavetype |
| | 39 | 4 | | PAVEMENT.THICKNESS | | |
| | 40 | 4 | | PAVEMENT.YEAR | | |
| | 41 | 1 | | RATING.GROUP | | |
| | 42 | 8 | | UPDATE.DATE | | |
| 41 | 43 | 1 | Primitive Road Flag | PRIM.RD.FLAG | Unknown | N,Y,S,X |
| | 44 | 2 | | SECTION | | |

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| | | | | | | |
|----|----|----|----------------|------------------------|----------|---|
| | 45 | 2 | | TOWNSHIP | | |
| | 46 | 3 | | RANGE | | |
| | 47 | 3 | | MAP | | |
| 42 | 48 | 12 | Agency - other | AGENCY.OPTION | Optional | available for use as defined by county (12 char) |
| | 49 | 2 | | DIRECTION | | |
| | 50 | 6 | | TRUCK.ROUTE | | |
| | 51 | 3 | | NHS | | |
| | 52 | 2 | | FOREST | | |
| | 53 | 3 | | FOREST.ROUTE | | |
| | 54 | 2 | | WEIGHT.RESTRICTION.WKS | | |
| | 55 | 3 | | BASE.ADEQUATE | | |
| | 56 | 1 | | HPMS | | |

Appendix E – WA-Trans Standards Outline

Data Standard Goals for WA-Trans

- Establish standards which enhance the will and ability of partners to collect and maintain the data
- Match the standard to the ability of the partners to collect and maintain data
- Identify a standard which allows data quality to improve over time – long term data maintenance and updates
- Identify funding incentives for partners to participate
- Standards need to recognize capabilities of existing technology and upgrade with technology improvements

Standards that will work in phases:

Meet most important business needs

Facilitate Data integration

Facilitate maintaining data long term

Data needs to be accurate, complete, non-complex, well documented, update cycle, relevant, digital, open standard format, import to digital mapping systems

Work thorough data model

Outline for Data Standards – Draft

Data

Data Available from Partners

Event based on dynamic segmentation of roadways?

Event based on x,y coordinates?

Data Storage Agreements

Update Cycles Target

Data Accuracy, Metadata based on ISB Standards for Framework

This will be a multi-scale dataset (Dueker white paper)

1:2400 (1:1000-1:5000) Urban

1:10,000 – 1:24,000

1:24,000 – 1:100,000 Rural (double check this)

Accuracy requirement for scale noted in Dueker white paper

Sample Data Set Standards

- Horizontal Datum: NAD 83/91
 - Vertical Datum: NGVD 29
 - Projection System: Lambert Conic Conformal
 - Coordinate System: WA State Plane Coordinates
 - Coordinate Zone: South
 - Coordinate Units: Feet or meters if NAD83/91
 - Accuracy Standard: +/-40 Feet or better
 - Vector Import Format: DLG, DXF, Shapefiles, TIGER
 - Database format: .MDB, excel, .DBF, or .txt (.CVS?)
 - Raster Import Format: TIFF, GRID, ERDAS
 - Metadata: Federal Geographic Data Committee (FGDC) Metadata
- Content Standards

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Metadata Standards

- Basic information about the data set
 - Title, Publisher
- Description
 - Abstract, Purpose
- Time Period of Content
- Range of Dates / Times
 - Beginning Date, Ending Date, Currentness Reference
- Keywords
- Theme
 - Theme Keyword
- Place
 - Place Keyword
- Data Quality Information
- Lineage
 - Source Information, Source Time Period of Content
- Range of Dates / Times
 - Beginning Date, Ending Date
- Entity and Attribute Information
 - Overview Description, Entity and Attribute Overview
- Point of Contact / Contact Information
 - Contact Person, Contact Organization, Contact Position, Contact Address
 - Address Type, Address, City, State or Province, Postal Code
 - Contact Voice Telephone, Contact Facsimile Telephone, Contact Electronic Mail Address

Plus a subset with bounding information, accuracy and coordinate information

Core Attribution

- Clearly identify required versus optional attributes for each data set.
- Developing a Data Model that includes appropriate attributes for WA, and that allow for querying pieces of the data.
- Define a process for adding new attributes.

Data layers needed to meet business needs

Data Dictionary (More information added here as terms are added)

- Metadata
- LRS – Linear Referencing System
- Centerline
- ROW – Right of Way
- Geocoding
- Entity
- Geometry
- Event
- Point Event
- Line Event

Symbols and Attribution (Acronyms)

- ROW
- LRS

Included Entities(Data Layers)

Core Data Sets:

- Federal
- State Highway
- Highway Ramps

***WA-Trans Project Meeting Notes
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- Milepost
- Rest Area
- Scenic Roads
- Local Roads
- Bridges
- Railroads
- Ferry Transit Routes – include ferry terminal locations
- Aviation Routes – includes airport locations
- Priority Programming?
- Engineering and Maintenance Districts
- Organization Boundaries

Reference (Boundary) Datasets:

- County Boundaries
- Urbanized Areas
- Reservation Boundaries

Additional Datasets:

- CRIS Data
- Survey Data

Includes Attribution

Translator

Data Input types

- Have to handle CAD (dxf, or dgn and dwg)
- Have to handle ESRI (mdb, shp, coverage, possibly E00)
- Have to handle MapInfo
- Have to handle GeoMedia
- Have to handle database formats (txt, xls, dbf, mdb)
- Have to handle Raster (jpeg, tiff, bmp, gif)
- Have to handle TIGER files

Projection

- Primary Projection for storage
- Variety of output projections
- Output files include .prj file
- Providing adequate documentation of projections coming in and going out of the translator

I. Translator Tasks (Dec notes App. E)

- Import Export a variety of file types (note above)
- Re-projection of coordinate systems
- Display multiple vector data sources and digital imagery
- Edit node, point, and line features
- Import/export/relate and edit tabular data content and structure
- Ability to set/adjust edit environment (snap tolerances etc.)
- Ability to conflate/"rubber sheet" spatial features
- Ability to merge/append geographic data sets
- Ability to conflate attribute data
- Ability to perform RMS analysis on point data (or output to a separate software package for analysis)

Query Ability

- Allow user to pull specification sections of entities (data layers)
- Requires careful planning of database attribution with Key ID fields that are logical to the user.
- May require pre-clipped data sets

***WA-Trans Project Meeting Notes
December 8, 2003***

QA/QC

Topological

Internal checks

- Does layer contain network topology?
- Do arcs meet correctly at intersections?
- Is the layer devoid of undershoots and/or overshoots
- Are there "pseudo nodes" at the jurisdictional boundaries?
- Are overpasses and or bridges separate features in the layer

Merge Checks

- Do arcs meet correctly at jurisdictional boundaries?

Scale/Spatial

- Does location accuracy of the layer meet the data model/business need requirement?
- Does the aesthetic representation of roadway meet the data model/business need requirement?

Attribute

- Are the minimum fields included as per the data model requirements?
- Are the field definitions correct as per the data model requirements?
- To what degree are attribute items populated with values?
- Are values valid?
- See QA/QC form for addressing attribute information

Metadata

- Has the required set of metadata been provided?
- Is the metadata complete?
- Does the metadata conform to the framework metadata standard?
- Does the metadata match the layer?
- See QA/QC form for metadata sections to include.

Security (See Access for Viewing/Downloading Files And Privacy/ Security Requirements forms for more information)

Before usage – disclaimers and release of liability forms from partners for each entity

Web based search and download system

Output to GeoSpatial OneStop format for Federal Agencies

Processes

How to obtain data from groups that do not have a digital system in place for storing information? What is the best way to approach partners who currently do not have a data collection method in place for creating a digital data layer? What should the framework team provide to create initial data layers for these groups? Digitizing line work from orthophotography

Stewardship (See December Notes App. D)

- Establishing a data steward for all data, and data stewards based on ownership for update purposes
- Agency Data Steward
- Local Data Steward
- Area Data Manger
- Framework Management Board
- Framework Administrator

Line Segmentation Rules

- Line layer segmentation and attributions
- Define a road segment
- LRS and addressing capabilities
- Addressing standards – see Oregon and Kansas

*WA-Trans Project Meeting Notes
December 8, 2003*

Core dataset will be the roadways with attribution

Establish method of identifying the best road/street centerline available

(See Dec Notes App. E)

Potential methods – Multiple factor subjective approach or the empirical RMS approach.

Will data edited in the partner's system and then resubmitted, or edited in the software translator system? How do we deal with conflated data and editing or adding an update? Should conflated data be submitted to stewards to be edited rather than having stewards submitting updates of original source data that need to go through the conflation process again?

Vertical Integration –

Dealing with multiple data sources for same geographic area

Facility Ownership

Best Available Data

Dynamic Segmentation

Attribution

How to deal with pulling lines from one source and data from another

Other conflation issues

Horizontal Integration

Mutually exclusive, adjacent segment data sources

Edge Matching

Anchor (End) Points and Nodes

Standardizing Attribution

Merging Data

Data Storage Method

SQL Database

Data Querying

Pre-clipped entities (data layers)

Handle this using database attributes

Use of boundary layers to assist with this

Projection Issues

Input Projection

Storage Projection

Output Projection

Training of Partners

Training for users – could also include GIS training as well as input and output training for the translator

Multi-agency sharing of equipment and training for acquiring centerline information

Data Storage Agreements

Versioning

Should system be put in place for updates based on dataset by dataset basis with different agreements for each partner based on that partner's update cycle?

Archive July 1st of each year?

Update Cycle

Release and liability agreements

Security

Web Module must be able to:

Data Provider

End User

WA-Trans Project Meeting Notes

December 8, 2003

Profile based on IP, ID, and password

Controls who has access to what layers

Maintenance and Updating Data

Dealing with restricted data layers

Usage disclaimers

Framework Library

List of data available via the web translator

Notification Process to let partners know of updates available

~~~~~

## **2 Architecture diagrams**

~~~~~

Top business needs

Map Production Capabilities

Event Location Analysis and Mapping (Geocoding and Address Matching)

Mapping Using Addressing

Street Names

Geocoding County Data

Routing

Metadata

Accurate Centerline and Right-Of-Way Line Work

Phase II E-911 Cell Phone X, Y Coordinate Mapping

Address Look-up

Hydrography

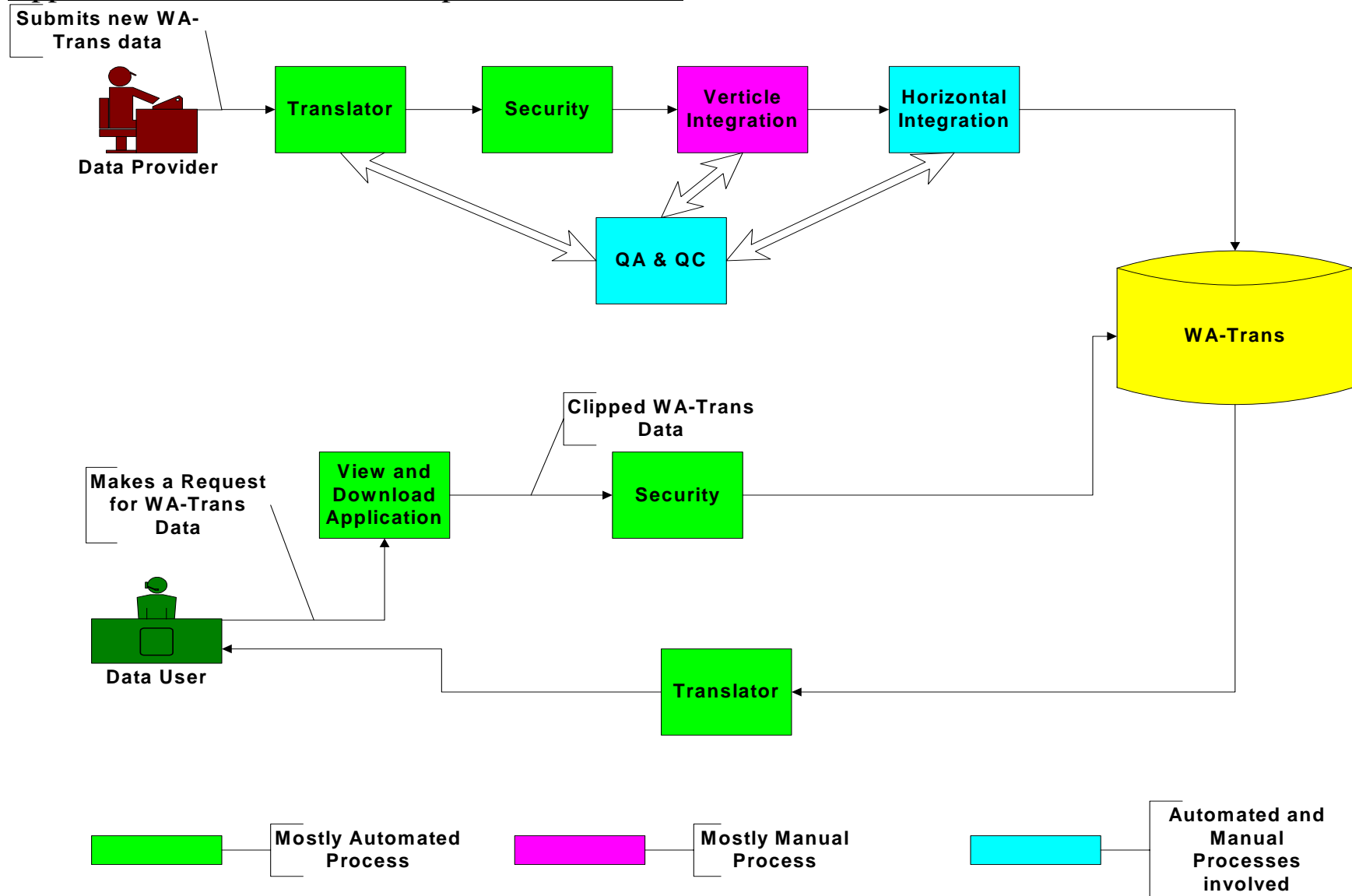
Statewide Basemap

Emergency Management – Transportation and Evacuation, Homeland Security

Roads Inventory (CRAB)

Survey Data

Appendix F – WA-Trans Conceptual Architecture



Action Items

| WA-Trans Steering Committee Action Items List | | | |
|--|----------------------------------|---------------------------------|--------------|
| What | Who | When | Status |
| Change integration diagram to remove the expectation of an XML or GML solution. | Jerry | April 12 | Assigned |
| Send Tami comparison of different metadata | Wendy | ASAP | Assigned |
| Check to see if Census has or plans to have tools for metadata. | Wendy | April 12 | Assigned |
| Develop high-level specifications of front-end for data submission | Tony | April 12 | Assigned |
| Update Access for Download and View with the suggestions regarding feedback and metadata | Joe | April 12 | Assigned |
| Develop a spreadsheet of agreed to core attributes for road identifying data types and sizes for review. | Dave Rideout | April 12 | Assigned |
| Set up meetings with various non-road transportation mode data experts to determine core attribution for them. | Tami | April 19 | Assigned |
| Attend the meetings with Tami and help develop core attribution for the assigned modes: Bike, Foot – Jerry (no meeting) Ferries – Jerry, Aviation – Roland, Railroad – Dave Cullom | Tami, Jerry, Roland, Dave Cullom | After Tami sets up the meetings | Assigned |
| Find out about WSDOT ramps naming and identification standards. | Tami | April 12 | Assigned |
| Update conceptual architecture based upon input provided | Tami | April 12 | Assigned |
| Send out latest version of Oregon data model | Tami | ASAP | Assigned |
| Put items on the agenda identified in the notes for the April 19 meeting. | Tami | April 12 | Assigned |
| <i>Write letters supporting WA-Trans and</i> | <i>All SC</i> | <i>ASAP!!! –</i> | <i>PSRC,</i> |

Note: *Italicized items are prior to December 8, 2003 Meeting but are still outstanding unless otherwise stated. Colored items are critical to other things being completed and should be looked at as high priority.*

Date: 8/11/2005

| WA-Trans Steering Committee Action Items List | | | |
|--|-----------------------|--|--|
| What | Who | When | Status |
| <i>funding of WA-Trans on letterhead of their organizations</i> | <i>Members</i> | <i>February 6 would be best!</i> | <i>Community Transit, WUTC, are complete</i> |
| <i>Update Accuracy in Business Needs Matrix and send to Tami</i> | <i>Dave Wolfer</i> | <i>February 27, 2004</i> | <i>Assigned</i> |
| <i>Make changes outlined in notes to Security Utilities Draft for WA-Trans</i> | <i>Ian Von Essen</i> | <i>February 27, 2004</i> | <i>Assigned</i> |
| <i>Follow up with WSDOT regarding servers and hosting WA-Trans</i> | <i>Tami</i> | <i>Long term effort</i> | <i>In process</i> |
| <i>Discuss how the Map application Chuck wrote for WA-Trans web application can be used to show project progress and where it should be served from.</i> | <i>Tami and Chuck</i> | <i>ASAP</i> | <i>In Process</i> |
| <i>Meet with the WSDOT assistant Attorney General to discuss this issue and get guidance on what our options are.</i> | <i>Tami</i> | <i>When completed with Tier 2 description and issues</i> | <i>Assigned</i> |
| <i>Turn WA-Trans into Census to provide us with quarterly extracts of survey data.</i> | <i>Wendy H.</i> | <i>ASAP</i> | <i>On-going</i> |
| <i>Provide results from CRAB survey to WA-Trans.</i> | <i>Dan</i> | <i>When completed</i> | <i>In Process</i> |
| <i>Work with Nick Marquardt, PSRC, and TNM to develop scope of pilot project.</i> | <i>Tami, Jerry</i> | <i>ASAP</i> | <i>In process</i> |

Note: *Italicized items are prior to December 8, 2003 Meeting but are still outstanding unless otherwise stated. Colored items are critical to other things being completed and should be looked at as high priority.*

Date: 8/11/2005

Tami's Status Report Steering Committee Meeting March 8, 2004

This has been an exceptionally busy month for me, mostly because of various funding requests I am involved in for WA-Trans. More about those later.

I attended an ESRI hosted Homeland Security and GIS Seminar that was very interesting. It was mostly directed to local governments and Linda Gerull from Pierce County was a presenter. It was good to find out how homeland security money is being distributed to local governments and to speak with ESRI grant people. I had lunch with them and we discussed the possibility of them providing a commitment to provide some assistance to the project. I identified the software development as a key area that we could use some assistance. I will be following up on that later with them.

I again met with the ODOT and University of Oregon people to work on the proposal for pooled research funding. The proposal is done with the exception of some tightening up of the numbers and schedule. I will be turning that in at the end of the next week. I will provide more information about it at the next meeting and bring copies for every one. I am meeting with representatives from Benton and Walla Walla Counties and cities within on March 9th in the Tri-Cities to begin discussing this pilot with them. Thanks to Joe Bowles for setting that up for me!

I have been very involved in the earmark process. The scope of the earmark request has changed. In order to include partners that have already invested a great deal and to work on meeting regional transportation planning business needs more effectively, instead of the earmark focusing just on WSDOT Northwest Region as a whole we are doing select counties, both in and out of the region. It is more closely aligned with the original Puget Sound pilot we discussed with Sound Transit and Puget Sound Regional Council. So the counties to be included are: Island, King, Kitsap, Pierce and Snohomish Counties. I am having to do a different version of the same request for each senator and each house member and the due dates are all different, so I have been kept VERY busy with that. I have also attached the three letters I have received to date to those requests. I anticipate they will be very helpful!

I am working on a funding proposal through the WSDOT process for information technology projects. It is slow and involved an agency prioritization process with many steps and lots of forms! I will also bring those to the next meeting for you to see. I plan to use the letters for this as well. It may really help get the project above other projects in this process!

One good thing that has happened is the WSDOT now has a “mandate” for WA-Trans. The National Highway Transportation Safety Administration (NHTSA) performed an audit on our traffic records process and made six recommendations. One of them is that we need a statewide GPS based LRS for all roads (not just state roads). There has been a committee set up to try to figure out how to meet these request and a savvy member recognized that WA-Trans was already trying to build this! So I am scheduled speak with them on March 10th.

We had a partner meeting March 2. It went well and I presented a lot of the material we have been working on. The only concerns were for the complexity and risk of the software we are trying to build, but there was general support for the concept. I hope to get more feedback as time goes on. It was well attended. Sam Bardelson gave a short presentation on the USGS Puget Sound implementation and Wendy Hawley gave an update on the MAF/TIGER Accuracy Improvement Project (MTAIP).

Our next meeting is April 19 from 9 a.m. to 2 p.m. in Olympia at the Transportation Building. Video-conferencing will be available. I also hope to provide lunch if you can bring some money. I will let you know in advance.

WA-Trans Project Meeting Notes
January 26, 2004

Attendees:

| Member | Association | Representing |
|---------------|---|---|
| Tareq Al-Zeer | WSDOT NW Region Maintenance and Ops | WSDOT |
| Art Shaffer | WSDOT NW Region Maintenance & Ops | Alternate WSDOT |
| Sam Bardelson | US Geological Survey Washington Liaison | The National Map |
| Roland Behee | Community Transit | Transit Organizations |
| Chuck Buzzard | Pierce County GIS | West side local government |
| Tami Griffin | WSDOT Geographic Services | WA-Trans (Project Manager), Facilitator |
| Wendy Hawley | Census Bureau | US Bureau of Census |
| Dave Rideout | Spokane County Engineers Office | Spokane County |
| Emily Terrell | City of Auburn Public Works | City Governments |
| Ian Von Essen | Spokane County GIS | E-911 |
| Dave Wolfer | WA Department of Natural Resources | WADNR |

Not Attending:

| Member | Association | Representing |
|-------------------|--|--------------------------------|
| Joe Bowles | Walla Walla County Surveyor | East side local government |
| Dave Cullom | Washington Utilities and Transportation Commission | Pipelines, Utilities, Railroad |
| Dan Dickson | CRAB | CRAB |
| Jerry Harless | Puget Sound Regional Council | MPO's, RTP's |
| Tony Hartrich | Quinault Indian Nation | Quinault Indian Nation |
| Gloria Skinner | WSDOT Office of Freight Strategy and Policy | Freight Interests |
| Jennifer Sorensen | Lummi Planning Department | The Lummi Nation |
| Terry Strandberg | Tulalip Tribes Community Planning Office | The Tulalip Tribes |

- Introductions, Status Questions, Action Item Review
- ~~Review draft description of "Universal Translator"~~
- Review draft description for "Access for viewing and downloading WA-Trans"
- ~~Review draft questionnaire for pilots~~
- Review accuracy in relationship to business needs
- Review draft description of "Security for WA-Trans"
- Review draft description of "Integration Software"
- Review communication, change management and issue management plan
- Pilot Planning – business needs and data for OR/WA pilot phase I
- Action items review & closing

Introductions and Review Action Items

- Tami sent a status report out prior to the meeting.
- Tami reported that she is transitioning to take over responsibility for the WSDOT multi-agency (state agencies) contract with GDT from Ron Cihon. There are several additional agencies that want to participate and they need to know about WA-Trans. Having one contact for GIS statewide transportation data for WSDOT will facilitate consistency and bringing more interested agencies into WA-Trans.
- Tami reported that she is applying for a 2005 federal earmark. It will be focused on the WSDOT NW region and she is asking for money to complete a pilot there. She felt it would be very helpful if all steering committee participants could draft on their organizations letterhead a letter of support for funding WA-Trans, explaining why they are involved. Those letters should be sent to Tami. She will use them for this earmark and also other funding opportunities. **Action Item** – SC Members send letters supporting WA-Trans to Tami.

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- Dave Rideout brought a spreadsheet with the CRIS data that Spokane County uses and information about this data and their use of it. It was agreed that the committee needs to discuss this at the next meeting and determine which attributes we need to put in the WA-Trans standards from CRIS (and other places). **Action Item** – Dave will send Tami an electronic copy of the spreadsheet. **Action Item** – Tami will put this on the agenda for the March meeting.
- Wendy expects to have a cross-reference between FGDC Metadata Standards, ESRI FGDC Metadata Standards in ArcGIS 8.3 and the ISB Standards for Metadata.
- Tami stated that she has resources to assist her with estimating software development costs for use in the transportation research pooled funding proposal. She also had resources to assist with writing a first draft of formal WA-Trans standards. She hopes to have an outline for the standards completed prior to the March meeting so the steering committee can provide input on any missing items. It is hoped that the first draft of the standards will be ready prior to the May meeting. ***She needs action items completed in order to keep those resources busy, so she may send out updated action item documents for review and e-mail response between meetings. If that happens it will be made clear when they are sent out when a response should be received by AND that no feedback in the required timeframe indicates SUPPORT!***
- After a review of the QA/QC process it was decided that it should be handled as a separate effort to define. Roland and Chuck volunteered to work on that. Jerry may need to be involved as well. Tami will update the Action Items.

Draft Description for “Access for Viewing and Downloading WA-Trans”

Joe Bowles sent Tami an updated “Access for Viewing and Downloading WA-Trans”. This document can be found in Appendix A of these notes. It was much closer to what the group felt was needed and additional feedback was notes as follows:

- Reference Data Sets include: county boundaries, multiple counties, Indian reservations, and statewide. The ability to be able to do x,y extents will also be included. Pre-clipped or special jurisdictional extents can be created and available based on the following: the partners can select one or two (decide the number later) pre-clipped extents which can be made available from a selection list, when there are several requests for a particular x,y extent a pre-clipped extent may be created for all to use.
- Under formats the ability to re-project will be described. Additionally it was suggested that multiple versions of re-projected data be maintained for download.
- There was a significant discussion of describing the environment. Several of these things are described in various sections of the document, however it wasn't clear to the group what the environment would be. This paragraph will be integrated into the document in the appropriate place: It is described as a spatial representation/ static/ non-GIS environment. The user clicks on a location on a map in an area and then the system looks for reasonable matches from the list of available extents to download and provides a list of metadata for the options. It could zoom or pan, but would be static like an Acrobat file.
- Or – Could be a very limited live GIS environment with “skeletal” data to orient the user. The user has the ability to select jurisdictions and then pick a data set and extract them.
- Another approach is to click x,y min/max extent. It could relate to the Universal Translator.

Action Item – Tami will speak with Joe and update the document for approval and send out. She can't wait until the next meeting and so will send it out and provide a deadline for feedback.

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Accuracy in Relationship to Business Needs

Dave Wolfer produced a spreadsheet that identified minimum accuracy levels needed to meet business needs. This spreadsheet is Appendix B of these notes. The definitions were based upon the target accuracies identified in the last set of notes. There were some business needs identified that needed changes in the accuracy levels identified.

One topic that came up was that an Statewide Reference Network using real time kinematics (RTK) is being established statewide. It will provide a new high accuracy for statewide GPS networks.

Action Item – Dave will update the spreadsheet and send it to Tami.

Draft Description for Security Utilities for WA-Trans

Ian provided a draft document called “Privacy/Security Requirements for Washington State Transportation Framework” that the group reviewed. This document can be found in Appendix C of these notes. He identified a web application that Spokane County is already developing as an example. We need to assume we need automated security which can be provided to update the data!

There were three different areas of WA-Trans where Ian identified security might be needed. These are:

- Data Provider Security (for inputting the data). This was identified as metadata and data sets in framework imbedded in the metadata which will make sure the provider is clearly identified and the data is clearly identified. It was suggested that Ian rename this section using the term “metadata”.
- End User security systems. This may or may not be needed in a system where all data is publicly available. But as Ian identified, there are circumstances where the data may not all be public data and so we need to consider and be prepared for this.
- Maintenance and Updating security systems – This is a critical need that WA-Trans has not yet defined. Ian began to define it. It involves data stewardship and may be a separate application which controls who can edit certain sections of the data.

It was suggested that the document be reorganized to put metadata and maintenance into a section first and then identify the end-user needs. It was felt that we don’t want to focus on a need that is not clearly legally defined before we focus on the needs that are clear and shared by all users for WA-Trans. It was also suggested that the first sentence the “will be publicly available” be changed to “may not be publicly available”.

Action Item – Ian will make the changes identified above to this document and send it to Tami.

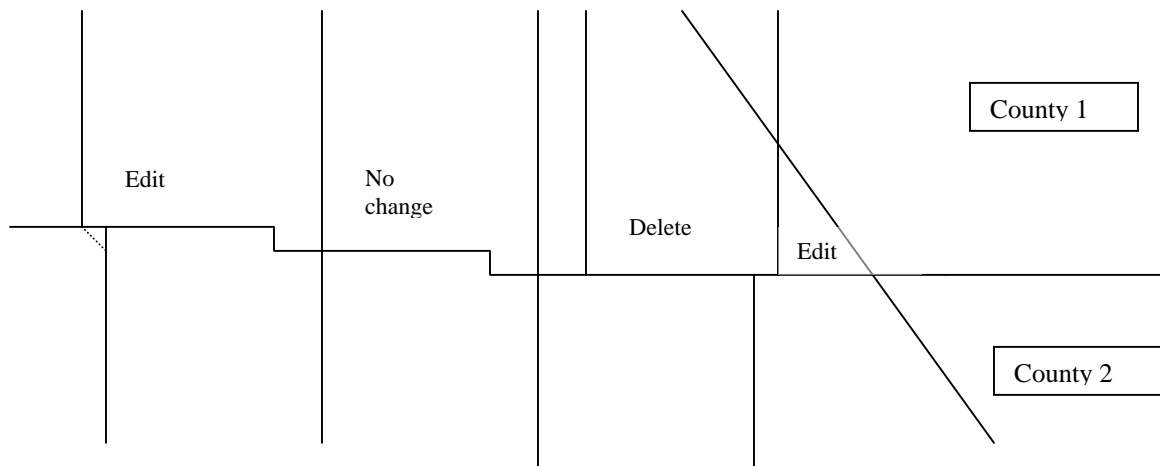
Draft Description of “Integration Software”

Roland provided two documents at the meeting. Appendix D includes the Draft Integration Specifications. The other document was developed by the Metropolitan Transportation Commission (MTC) about a nine-county framework in California that will be completed soon. This document will be sent out separately. It described a process for integrating data that Roland felt was one he uses and can work from. The second document is his high level specifications for integration software. Roland has decided that the integration process is closely married to the translation process. A meeting will be set up with Jerry, Roland, and Tami soon to work on this.

There are two types of integration that are important. These are vertical integration and horizontal integration. Vertical integration is described as dealing with overlapping data and some strategies for dealing with this. Segmentation is a part of this as different data providers will also have different segmentation schemes. Horizontal integration involves edge-matching. A process is a successful candidate for automation if it is repeatable. There is a significant amount of the human element in this process. If you automate iteratively and carefully over time you can automate it.

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Roland illustrated a process that showed using a delete and edit tool to combine data and edge map.



Build Tools include:

1. Delete
2. Edit – identify arcs to edit to make it fit. Edit features are copied to a hybrid layer. Within the edit layer (hybrid) they would be adjusted so they spatially connect.

This could be automated. Roland isn't sure if the process precludes anchor points. We could establish anchor points. Dave R. felt that if changes data was flagged it would be useful to the potential user and data provider.

It may require a different process based upon the negotiations. The first time out requires a manual integration process and then automation can be developed.

A topic for the next meeting is to define some business rules for how we handle integration such as using the better data from one source.

Roland also identified the process of mapping better attribution from one-source to better line-work from another.

Action Items – Roland and Jerry will meet to make sure both requirements are cohesive.

Communication, Change Management and Issue Management Plan

The group reviewed the change management and issue management processes and forms Tami provided in the communication plan. This document is Appendix E of these notes. There were some changes requested. They include:

1. Labeling the "yes" and "no" of decision points in the flow diagram for change management.
2. In the Change Request Form labeling the type of changes as: Geographic extent, source data set.
3. In the Change Request Form adding a section for not approved with a written justification.

Action Items – Tami will make the requested changes.

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Pilot Planning – Business Needs and Data for OR/WA Pilot Phase I

The committee was asked to identify some specific business needs to check for the pilot. The identified items were:

- Produce an edge-matched map
- Data integration to bring attribution
- Addressing and LRS in the area.
- **Action Item** – Tami will call Joe and investigate visiting Walla Walla County and Benton County after the next meeting in Spokane.
-

Action Item Review, Closing

Due to attendance we weren't able to complete the agenda. Those items will be discussed at the next meeting unless they need to be done sooner, in which case they will be mailed out for approval.

The next meeting will be held in Spokane on March 8 in the WSDOT Eastern Region Headquarters Building at 2717 N. Mayfair from 9 a.m. – 2 p.m. in the Pend Orielle Room.

Appendix A – Draft Access for Viewing/Downloading Files

General

A web portal will be established to list the agency's core data sets as well as additional supportive layers for background and reference. Mapping functions will be available for both navigation and identification of data sets and layers.

Structure

The website will be composed of the following pages:

- Framework overview
- Web portal page
- Data Sets for Downloading
- Disclaimers/Release of liability to be read before accessing mapping and data sets for downloading
- Resource links for other framework and supporting data layer sets

Viewing

The following data sets are examples of what may be included in the interactive web page. Core Transportation layers and metadata files will be available for distribution through the web portal. Transportation Framework will provide links to the originating agency's website for downloading or accessing of data sets belonging to other agencies or entities. Metadata for those data sets would be the responsibility of the provider.

Core Data Sets

1. Federal
2. State Highway system
3. Highway Ramps
4. Mileposts
5. Rest Areas
6. Scenic Highways
7. Local Roads
8. Bridges
9. Railroads
10. Ferry Transit Routes
11. Aviation Routes
12. Priority Programming
13. Engineering and Maintenance Districts
14. Organization Boundaries

Reference Data Sets

1. County Boundaries
2. Urbanized Areas
3. Reservation boundaries

Additional Data Sets for Download/Access

1. CRIS Data (Mobility?)
2. Survey Data

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Map functions to be made available:

- Zoom in/out
- Full view
- Pan
- Search by:
 - Location (regional, county or city)
 - Identifiers (street names or intersections)
 - Jurisdictional agency (federal, state or local authority)
- Query Data
- Export Data by
 - Selection
 - Data set name
 - All Data Sets shown

Access for Download

Download of the data will be available both through the web map page by selecting the data to be downloaded from the map or through a link to a web page that enables a direct download of the original data set. The second option will be a traditional resource page that lists the data sets available by description, format and location. Downloading complete data sets through a traditional access page in tabular format will provide services for clients that may not have adequate Internet access to support access of the interactive web page. These data sets would be available based upon their geographic extents, e.g. by state, county or regionally significant areas.

Formats

Formats to be made available for Download/Access

1. Shape files, ArcGIS feature data sets for ArcSDE, .dxf or .dgn,
2. .MDB, Excel, DBF, .txt,
3. JPEG, TIFF, bmp or GIF
4. Projection- Washington State Plane South NAD 83 only. (.PRJ files to be provided with shape files)

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Appendix B –Trans Framework Business Needs/Accuracy Requirements Matrix

Trans Framework Business
Needs / Accuracy
Requirement matrix

| Business Need Category | Description | BN# | Urban | Rural | Remote |
|------------------------|---|-----|-------|-------|--------|
| Archiving | Access to historical versions of WA-Trans | 58 | DUP | DUP | DUP |
| | Current and Historic Zoning Maps | 64 | DUP | DUP | DUP |
| Attributes | Street Names | 51 | H | M | L |
| | Designate Indian Reservation Roads Explicitly | 61 | H | H | H |
| | Development and Maintenance of Street Names | 94 | H | M | L |
| Cadastral | Accurate centerline and right-of-way line work. | 48 | H | H | H |
| Dispatch | Coordination of Transportation During Emergencies | 13 | H | M | L |
| | Support the "Trip Planner" Project effort | 22 | L | L | L |
| | Coordinated dispatch of on-demand transportation | 31 | M | M | M |
| | Expansion of Lifelines Statewide | 42 | M | M | M |
| | Determination of Evacuation Routes | 43 | M | M | M |
| | Access into a Disaster Area | 44 | M | M | M |
| | Fire Suppression Facilitation | 89 | M | M | M |
| | Trip Planner for Freight | 100 | M | M | M |
| | Event Locations | 32 | M | M | M |
| | Routing | 5 | | | |
| | Facilitate Bridge Data Sharing Between Various Road Authorities | 15 | H | H | H |
| | Representations with bi-directional carriageways | 18 | M | M | M |
| | Collecting Collision Data and Locations | 19 | M | M | M |

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|--|--|----|---|---|------|
| | Providing Collision Data to Local Governments | 20 | M | M | M |
| | Work with HPMS/FC replacement | 21 | | | |
| | Notification of Ferry Neighbors | 29 | L | L | L |
| | Inventory data of features along the roadway | 33 | M | M | M |
| | Snow removal routes and features along the route | 34 | L | L | L |
| | Mapping using Address Matching | 36 | M | M | NONE |
| | Roads Inventory to CRAB (County, Tribal, City, State) | 38 | M | M | L |
| | Event Location Analysis and Mapping (Geocoding/Address-matching) | 39 | M | M | NONE |
| | Crossing Safety | 45 | H | M | NONE |
| | General Railroad Safety Inspections | 46 | M | M | L |
| | Location of specific addresses (geocoding). | 49 | M | M | NONE |
| | Who can provide utility services at a specific location? (Geocoding) | 50 | M | M | L |
| | Unimproved or Temporary Roads | 52 | M | M | H |
| | Geo-Coded Freight Truck Flows | 54 | M | M | L |
| | Freight Goods and Transportation System Updates | 55 | M | M | L |
| | Identifying Alternate Sources for Roads Funding | 62 | L | L | L |
| | Address Geocoding of Crime Incidents | 65 | M | M | L |
| | Voter Mapping for the Auditor | 66 | M | M | L |
| | County Addressing | 67 | M | M | NONE |
| | Address Lookup | 68 | M | M | NONE |
| | Traffic Count Locations | 70 | M | M | NONE |

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|------------------------------|---|-----|---|---|------|
| | Mapping of CRIS Information | 71 | M | M | NONE |
| | Accident Mapping | 72 | M | M | L |
| | Pavement Management | 75 | H | H | L |
| | Vegetation Spray Areas | 76 | M | M | L |
| | Snow Route Mapping | 77 | M | M | L |
| | County bridge locations | 79 | N | M | L |
| | Emergency Management Event Mapping | 81 | M | M | L |
| | Geocoding County Data | 82 | M | M | L |
| | Phase II E-911 Cell Phone X,Y Coordinate Mapping | 92 | M | M | L |
| | AVL X,Y Coordinate Mapping | 93 | H | M | L |
| | CVISN, Weight-in Motion, and Weight Station Information | 95 | H | M | L |
| | Identifying Freight Chokepoints | 96 | M | M | NONE |
| | International Border Crossing Delay for Commercial Vehicles | 97 | L | L | NONE |
| | Location of Freight Hubs | 99 | L | L | NONE |
| | Right-of-Way Feature Inventory | 74 | H | H | M |
| Event location & hydrography | Impervious Surfaces Analysis Data | 6 | H | H | H |
| | Water Crossings Roadways | 7 | H | H | H |
| Interface functions | Public Access to Records | 40 | L | L | L |
| | Washington State Transportation Data for the National Map | 56 | M | M | M |
| | Compatibility with Related Transportation Frameworks | 59 | H | H | H |
| | Coordination With Federal Agencies and States | 101 | H | H | H |
| Mapping | Communication of Survey Data | 1 | H | H | H |
| | Future Plans for Transportation Infrastructure | 2 | M | M | L |

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|--|---|----|---|---|------|
| | Communication of Recently Completed Projects Along the Roadway | 4 | M | M | L |
| | Facilitates Collision Analysis using Transportation System | 8 | M | M | L |
| | 20-Year Transportation Plan Development | 9 | L | L | L |
| | Tracking Activities along Transportation Network by Organizations without Jurisdictional Responsibility | 10 | M | M | L |
| | Communicating Improvements to the Roadway | 11 | L | L | L |
| | Statewide Base Map to use in Communication | 12 | L | L | L |
| | Transportation Infrastructure Vulnerability Assessment | 14 | L | L | L |
| | Facilitate Developing Travel Demand Forecasting Models | 16 | L | L | L |
| | Building the Highway System Plan | 17 | L | L | L |
| | Communicate and Analyze Habitat Along Roadway | 24 | L | L | L |
| | Communicate and Analyze Park & Rides and Connecting Routes | 25 | L | L | NONE |
| | Communicating Project Plans with Public, Various Road Authorities and Other Stakeholders | 26 | L | L | L |
| | Integrate Multi-modal Transportation Options | 27 | M | M | M |
| | Data for Terminal Planning Analysis and Communication | 28 | L | L | NONE |
| | Mapping, Analyzing and Communicating Traffic Flow | 30 | L | L | NONE |

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|--|---|----|-----|-----|-----|
| | Information about activities on all roadways to answer customer calls | 35 | L | L | L |
| | Map Production | 37 | HML | HML | HML |
| | Coordinate Ferries Schedules with Traffic Management | 41 | L | L | L |
| | Trespass Reduction | 47 | H | H | H |
| | Identification of Potential Partners in Transportation Planning | 63 | H | H | H |
| | County Atlas | 69 | H | H | H |
| | County Transportation Improvement Plan | 73 | L | L | L |
| | Intersection Improvement Maps | 80 | M | M | M |
| | Using road and road feature information in the effort to protect wildlife | 83 | L | L | L |
| | Supporting Tribal Treaty Rights | 85 | H | H | H |
| | WA-Trans needs to support network analysis regarding moving forest products. | 86 | L | L | L |
| | Provide support to law enforcement in public lands management | 87 | L | L | L |
| | Support in homeland security on public lands | 88 | L | L | L |
| | Facilitation of Public Land Management Engineering Activities | 90 | L | L | L |
| | Facilitation of Public Lands Management Development and Maintenance of Recreation | 91 | L | L | L |
| | Communicate and Analyze Transportation Features in a Watershed | 23 | L | M | M |

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| | | | | | |
|-------------|--|----|---|---|------|
| | Tracking Fisheries Information Related to Road/Water Structure | 57 | L | L | L |
| | Supporting work on fish and related hydrography to roads | 84 | L | L | L |
| Metadata | WA-Trans Metadata | 60 | H | H | H |
| Modal types | Railroad Line Information | 3 | H | M | L |
| | Non-motorized Transportation Plan | 78 | H | M | L |
| | Freight Access and Freight Exchange at Marine Deep-water Ports | 98 | M | M | NONE |
| | Navigable Waterways and Port Facilities including freshwater ports | 53 | M | M | NONE |

Appendix C - Privacy/Security Requirements for Washington State Transportation Framework DRAFT

Privacy/Security Requirements Washington State Transportation Framework DRAFT

Abstract: Security – A portion of WA-Trans (Washington State Transportation Framework) transportation data will be publicly available; however, in order to have a complete road framework within WATrans for all of Washington State, open records exempt (e.g., tribal data, etc.) and other types of private/commercial sector data will also need to be included which could have use and access restrictions. Business functions previously identified by WATrans partners like emergency management, E-911, and various State and Local governmental agencies require a complete and comprehensive statewide transportation framework. To facilitate and support the integration, exchange, updating, and access of both unrestricted and restricted transportation data within WATrans there will need to be a security system. In addition, the data providers as well as the end users of the WATrans may also want to add “value added” data or services, whose use could require fee transactions, license transactions, and the identification of end-user use restrictions.

Minimum Requirement of WATrans Web Based Security System

Many of the Security Requirements listed below are directly dependant on the type of data stored with in the WATrans Framework and the use restrictions associated, or negotiated by WATrans with Data Providers, and therefore may not be required of a WATrans Web Based Security System.

Data Provider Web Based Security System Requirements

WATrans Web Based Security System must be able to:

- 1) Identify Data Layer Developer/Owner (i.e., Source)
- 2) Identify Individual Developer/Owner within a Concatenated Statewide Data Layer (i.e., Multiple Sources)
- 3) Identify Layer Use Restrictions as delineated by Developer/Owner
- 4) Identify Attribute Use Restrictions within a given Layer as delineated by Developer/Owner
- 5) Identify Licensing Requirements Associated with Private Sector/Commercial Data and/or with an Open Records exempt Data Provider
- 6) Identify Private Sector/Commercial or Open Records exempt Fee Requirements
- 7) Provide for Method to Perform/Process Fee Transactions for Private Sector/ Commercial or Open Records exempt Data Use

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End User Web Based Security System Requirement

WATrans Web Based Security System must be able to:

- 1) Identify End User
 - a) Via some combination of IP address, Login Account, Password, NT authentication, etc.
- 2) Identify End User needs for specific restricted WATrans Data
 - a) Includes spatial extent of request
 - b) Use Restrictions associated with request
 - c) Licensing Requirements of data request
 - d) Fee Requirements of data request
- 3) Provide for End User Profiles; Profiles would include:
 - e) Identification of End User, Agency, Organization, Company, etc.
 - f) Identification of End User Data Access Levels (by layer & attribute)
 - g) Identification of existing Licensing, Fee Payments
- 4) Transact Data Provider required License Agreements & Use Fees in order for End User to access restricted data in timely manner.

Maintenance & Updating Web Based Security System Requirement

WATrans Update application would be a separate application from End User Data Access application

WATrans Web Based Security System must be able to:

- 2) Identify Data Provider
 - a) Via some combination of IP address, Login Account, Password, NT authentication, etc.
- 3) Provide for Data Provider Profiles, Profiles would include:
 - a) Identification of Data Provider, Agency, Organization, Company, etc.
 - b) Identification of Data Provider Update Access Levels (by layer & attribute)
 - c) Identification of the spatial extent of the Data Provider's Update Access Rights
 - d) Ability of Data Provider to modify Use Restrictions, Licensing Requirements, Access Fees as identified by Data Provider for their Data submissions/updates only
- 4) Record, Time Stamp, and Identify Data Provider for each record updated within the WATrans database by the Web Based Update Application in order to maintain data integrity and to identify source of data errors and or data corruption.

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BACKGROUND DOCUMENTATION

Security Issues

Road Data – Generally not viewed as a security threat in that anyone can delineate it from satellite & digital ortho photography sources; however, what makes road data useful within a GIS is it's associated attribute information (road names, types, function classes, address ranges, etc.) for geocoding, routing, etc. and that does have to be acquired from governmental agencies and private developers of such data which may have use restrictions.

Some Transportation Framework Data could be viewed as a security threat

For example pipelines (gas, oil, etc.), where we actually have a bonafide homeland security threat, have been pulled from Federal Web Sites.

Other concerns reside with specific attributes of or ancillary types of transportation data; examples could include 1) bridge attributes (structural characteristics, load characteristics, etc.) and in addition pipelines are sometimes associated w/ bridges and 2) network monitoring of trucking shipments which containing secured materials (nuclear, hazardous wastes, etc.). 3) network monitoring of rail system shipments, etc.

Reasons to access Restricted Transportation Data

- 1) The desire to access state and local governmental transportation data whose maintenance has been outsourced and copyrighted by private sector.
- 2) The desire to access governmental transportation data exempted from open records laws, e.g. tribal transportation data.
- 3) The desire to access transportation data associated with private land holdings (e.g. private timber companies, agribusiness, etc.).
- 4) The desire to use third party application utilities, e.g., private sector based heuristic routing applications, etc.
- 5) The desire to use private sector transportation value added data (e.g., private sector routing attributes, intersection turntables, impedance values, etc.),
- 6) The desire to use county & city transportation data where there is embedded private sector data within their road data e.g. King County with Kroll Map Company.

GeoSpatial One Stop has problems similar to those of WATrans

GeoSpatial One Stop is looking into supporting the development of " **Data Access Catalog Services**" where automatic licensing and fee transaction can occur automatically via the web. **Data Access Catalog Services** is one tool that GeoSpatial One Stop is supporting in order to create comprehensive geospatial data which has been integrated from public/private sources that will allow for the development of a fee based transaction service for certain types of geospatial data.

Development of a Data Access Catalog Services Specification

(excerpt from GeoData Alliance Draft Document)

Joint effort of the GeoData Alliance, OpenGIS Consortium, and the FGDC

Goal. The goal is to develop an abstract and implementation-specific standard for encoding the elements of information that define the ownership characteristics of digital geospatial data, including but not limited to ownership and copyright, access, privacy restrictions, security restrictions, liability, and cost of data or services. (See attached Document)

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Digital Rights Initiatives (Microsoft)

Acceptance of digital rights management (**DRM**) still must endure a number of growing pains and overcome issues such as: deployment and ease of use barriers; establishing trust networks; cost and infrastructure requirements; and the fact that only certain users can truly benefit from the technology... But with companies committing more and more intellectual assets to digital media and with federal regulations such as the Health Insurance Portability and Accountability Act (HIPAA) governing document confidentiality, corporations are seeking answers to their concerns. The ability to restrict who can see data and then forward, copy or print it out based on a set of managed rights embedded in a file has become an intriguing idea.

Digital Rights Initiatives & GeoSpatial Data

(Excerpt from GeoData Alliance Draft Document "Open Digital Rights Management for Geodata")

A great deal of work has been done in the area of data ownership and rights management. This work is of interest to the Geospatial community in that many geospatial data providers need to control who has access to their data and how it is used. The lack of this control has been a barrier to broader adoption of Web based geospatial technologies. This document will identify some of the current industry trends in addressing this issue, and will lay out a pathway for advancing data ownership issues within the Open GIS Consortium, Inc. (OGC) member driven process. It should be noted that this document has resulted directly from interest expressed by the Open Data Consortium (www.opendataconsortium.org), the GeoData Alliance (www.geoall.org) and the Federal Geographic Data Committee (www.fgdc.gov). This Program Development Plan is intended as a guide to OGC members to apply in their efforts to advance interoperability initiatives that address rights management.

Background

As geographic data content (geodata) become more widely available in digital form over ubiquitous networks, it becomes easier to distribute, share, copy and alter. While this is generally a good thing, many organizations involved in the production and trading of geodata now find the need to protect their Intellectual Property (IP) assets through the digital distribution value chain. Organizations want to specify, manage, control and track geodata distribution within safe, open and trusted environments. A system of operating agreements and interoperable technologies are needed to enable broader distribution and use of geodata while protecting the rights of producers and users.

In the marketplace or e-commerce models for dissemination and use of Intellectual Property (IP) assets, geodata are treated as commodities to be priced, ordered, traded and licensed. Direct monetary reward, however, is often not the motivation or is only a minor one behind the desire for more rigorous control of IP assets. Harlan Onsrud argues for the GeoData Alliance that the incentive structures implicit in "library systems" are an appropriate model for motivating data producers, collectors and traders to document, share and otherwise disseminate their geodata. Onsrud observes that the library system is a "chaordic" framework of seemingly ad hoc agreements among stakeholders that strikes a balance supporting "...strong public goods, access and equity principles while fully protecting the intellectual property rights of authors and publishers."¹

Rapid technology advances have tipped the balance of laws that establish incentives for producers to make their content available while maintaining the access, use and equity rights of users. Onsrud envisions the establishment of a

¹ Harlan Onsrud, "Exploring the Library Metaphor in Developing a More Inclusive NSDI."

http://www.geoall.net/library_harlanonsrud.html

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framework of operating agreements, similar to that in which libraries develop and share resources, as one way to reestablish a balance, paving the way for geodata to be more accessible and useful to larger numbers of users.

The specific requirements for protecting IP rights by controlling geodata distribution and use, however, are extremely complex and vary widely depending heavily on factors such as:

- The “business” of the organization (i.e., the motivations of commercial, public-sector, and academic organizations to make their geodata available)
- The type of data and media formats (e.g., physical, electronic, text, graphic, audio, video, vector, raster, observation, etc.)
- The content distribution channels (e.g., size of content, network bandwidth, types of end devices)
- The types and granularity of intellectual property rights to be protected and the contractual obligations for its use (e.g., unlimited distribution, license to use, license to reuse parts, limited distribution, sensitive/classified, etc).

Just as the requirements vary, so too does the enabling technology. Digital Rights Management (DRM) is a popular term for a field that emerged in the mid-1990s when content providers, technology firms and policymakers began to confront the imbalance of technology and laws caused by the effect of ubiquitous computer networks on the distribution of copyrighted material in digital form. DRM is about creating, packaging, distributing, controlling and tracking content based on rights and licensing information. DRM is closely integrated with Content Management System (CMS) technology for creating metadata, storing and organizing digital content in support of workflow, search, browse, access and retrieval processes by users in workflows, enterprises and information communities.

WA Trans Initial Goals

1) One of our goals is to develop mutually beneficial relationships between state, local, tribal, governments and the private sector; not to challenge local, tribal government policies or authority over their own transportation data. i.e., not to have **WATrans** become an adversarial entity, **WATrans** needs to be a value added service. Currently the public and private sectors are already acquiring GIS road data from counties and cities, tribal entities, and the private sector.

1) Our initial goals & pilots should be modest, i.e., building the first statewide accessible transportation framework for use by state agencies. **WATrans** should be focused on making local & state government agencies & departments more integrated, efficient, and effective via the transportation framework.

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Who are the customers for the Secured Data portions of our Transportation Framework

- 1) State & Local First Responders (E911); Washington State Military, County Emergency Management, Local Law Enforcement i.e., Police, Fire, etc.
- 2) State Agencies who need to have access to a complete Transportation Framework (which includes tribal, private sector, and excepted local government data).
- 3) Local & Tribal Governmental Agencies who need to have access to a complete Transportation Framework (which includes tribal, private sector, and excepted local government data)
- 4) Private Sector Users

Security arrangements will be partially dependant on who hosts the Transportation Framework.

WSDOT vs. Private ASP

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Examples of Security related GIS Web Applications

The following is an example of an existing software application that does have security embedded in the web application that allows one to control end user access to specific GIS layers, GIS attributes, & GIS functions. This product web based software, MapOptix, is from an ESRI business partner, GeoNorth works in conjunction with ESRI's ArcIMS product and allows web administrators to control security access by developing end user profiles that define such access.

<http://www.geonorth.com/index.cfm?fuseaction=mapoptix>.) An application like this could also be used to control security access to specific based WATrans Transportation Framework Data, and application functionality. See description below.



The Profile Control menu is used to control the specific data and functionality that are published to specific users. Using this menu, users can be assigned to a profile with certain layers, functions, databases, etc.

Layers can be added to a profile from the available list of layers loaded into the MapOptix Map Administrator.

Buffers can be defined that select map features from a target layer that are within a predefined distance of the selected feature (e.g. taxlots within 500 feet of a selected street centerline.) The selected features are highlighted on the map and associated tabular information is displayed.

GeoSearch (drill down) spatial queries can be defined that will perform polygon intersections with other layers to extract specific attribute information from the map layer(s) and related database table.

The Profile Control is also where tabular **Query** panels are established for use in the MapOptix client interface.

The assignment of map **Extents** is provided through the profile menu.

The appearance of the profile **Legend** is manipulated through the profile menu.

To copy or **Clone** a profile click on the "Clone" icon. This will copy all or certain content of a profile to a new profile.

To add a profile click on the "Add a Profile" hypertext link. To remove a profile click on the respective "Remove" hypertext or icon for the profile.

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Profile Layer Management

Available map layers can be assigned to a Profile. This allows for only selective map information to be provided for a particular profile. To display and add layers to a profile click on the "Layers" hyperlink on the Profile Control menu.

The layer listing for a profile contains detailed information about the layer source, scale, and display. To change layer display settings click on the layer name.

To add a layer click on the "Add Layer" hyperlink found at the bottom of the layer name list. (Not visible in the following example.)

| Layers Available to Cowlitz Profile | | | | | | |
|---|-----------|-------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| • Edit/View/Add/Remove Layers assigned to a profile. Enable Identify/MapTip action for a layer. | | | | | | |
| Layer Name | Min Scale | Max Scale | Default Display | Base Layer | ID/Maptip | |
| 60' Resolution Hillshade | 1:25,000 | 1:1,000,000 | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 80% Slope - 10 Meter DEM | None | None | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 80% Slope - 1995 Ortho DTM | None | None | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 80% Slope - 1996 Ortho DTM | None | None | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Active Landslides | None | None | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Aquifers | None | None | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| City Boundaries | 1:20,000 | 1:1,000,000 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| County Boundary | None | None | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| DLC Boundaries | None | None | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

For each layer assigned to a profile there can be separate display properties than those specified in the Layer Maintenance section.

By default, layer display properties will adopt those settings in the Layer Maintenance section. To set layer properties click on the layer name. This will display the following menu form.

| Edit "City Boundaries" Layer | |
|---|---|
| • Modify Profile Layer display settings | |
| Note: These values will override top level values unless "Layer Default Setting" is specified. | |
| Default Display Status | <input checked="" type="radio"/> On <input type="radio"/> Off <input type="radio"/> Layer Default Setting |
| Base Layer | <input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Layer Default Setting |
| Display Interface Legend | <input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Layer Default Setting |
| Display Print Map Legend | <input checked="" type="radio"/> Yes <input type="radio"/> No |
| <input type="button" value="Submit"/> <input type="button" value="Cancel"/> | |

If the Default Display is checked "on" then the layer will be turned on when the user accesses the profile. If the Base Layer is set to "Yes", the layer will display on the map but cannot be turned off. The Display Legend Interface determines whether or not the layer shows in the layer/legend interface in the MapOptix Client Interface. If the Print Map Legend is set to "yes", the legend for the layer will be available for inclusion in the print map legend.

To assign a result definition that will be visible for an identification or maptip, click on the ID/MapTip checkbox. This will provide another menu to change the identification result definition.

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To remove a layer from the profile click on the **X** icon.

Appendix D1 - High Level Spec for WA-Trans Integration Software (2nd Draft)

High Level Spec for WA-Trans Integration Software (2nd Draft)

Vertical Integration:

The ODOT Process/Requirement document raises several issues regarding overlapping data or “vertical integration”. The problem stems from the fact that most of our GIS street databases include many roads that fall outside our agency’s jurisdiction. Many cities maintain GIS data for their entire urban growth area in anticipation of the day when they may eventually annex this territory. For obvious reasons, the same area is included in the local county GIS as well (from different data sources!). Likewise, both the city and county maintain a GIS representation of the state highways that traverse their region. These same highways are included in a GIS maintained by the state DOT.

There are at least two strategies for resolving this overlap in data –both of them are messy.

1. Facility ownership is the sole criteria for data contributors. If it’s a state highway, the data comes from the state. If it’s a city street, the city contributes the data. Forest roads come from the forest service.

Problems: How do we equitably divide up the data? What if the “owner’s” data is less accurate than required? How about a state highway that goes right through a dense urban core with lots of city facilities, sewer, water, electrical, etc...? We’d need widespread agreement on administrative boundaries to make this work.

2. The “best available data” is used, regardless of ownership.

Problems: How do you select the “best” data? How do you encourage adoption of the “best” data by jurisdictions that did not supply it?

Segmentation

Regardless of the strategy adopted for vertical integration, we will still need to deal with varying segmentation schemes in any area with overlapping data. If all my county’s data was used in framework with the exception of a major city in my county, how do I make my Arcview vehicle tracking application work in framework when my delivery route traverses from the county-supplied data to the city-supplied data? The routing was constructed on the county’s road segmentation scheme. For a given section of roadway, perhaps the county data is broken into two segments. The same road might be broken into three segments by the city.

A common thread I’ve detected in all the proposed solutions to reconciling segmentation schemes is a high degree of complexity.

One solution (I think it was proposed by Dueker), is to treat segment end points like events. A unique ID is assigned to the road feature as a whole (I-90 gets one ID from Seattle to Idaho). All of the various segmentation schemes (probably different from each county and WSDOT) are maintained as Dyn-Seg events at the appropriate measure location along the route. If a segment is “split” by a new intersection, the attribute tables of a framework contributor (based on measures) are adversely impacted by a change in segment ID.

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There are undoubtedly complexities and subtleties to this idea that I am not aware of. I just wanted to get the idea out for discussion.

Edge Matching:

To give each data contributor the option of accepting or rejecting edits made to their data and create a system of efficiently tracking edited streets to facilitate future updates, there will be no direct editing of the contributor's source street data. Instead, a flag field will be populated for each feature in the source data and edits will be made to a hybrid layer containing only streets that require edits. In the source data, **a tool will be used** to assign each street segment 1 of 3 flag values: "Delete"- indicating the street is to be dropped from the original layer for edge-matching purposes, "Edit" – indicating the street's length and/or shape will be modified, and "No Change"- indicating the street remains unchanged. **An additional tool is needed** to unflag streets that may have been selected and flagged incorrectly. The flagging process is accomplished by panning across the boundary of neighboring data providers (e.g. –Counties) viewing streets that come close to or cross the edge, and flagging these streets with either the "Delete" or "Edit" values using single -click flag tools. Once complete, all streets without flag attributes will be populated with "No Change". To prepare for editing, all streets that are flagged for editing will be queried and saved to a hybrid data layer.

Editing Streets in the Hybrid Data Layer

Three criteria (at least) dictated how the editing will be done:

1. The street segments should meet at or near the jurisdictional boundary line whenever possible
2. The edits should make sure the ends of the same street in neighboring jurisdictions are topologically connected
3. While the edits may have moved street segments, the street should stay within the street right-of-way as determined by each jurisdiction's parcel boundary and/or aerial photography whenever possible
4. If permanent **anchor points** "*Duekers*" are to created, they could be incorporated in the integration process at this point. Predefined anchor points would be used as a reference layer for arcs to "snap" to during the editing process. If arcs are undergoing edits for the first time, a new anchor point would need to be established at the desired meeting point along the contributor's data boundary.

The parcel data and aerial photos are to be used as references for the last criterion. The first and second criteria can be met by **using topological snapping tools to trim or extend existing street features, and to snap features to others**. Once the editing process is complete, the source data with the flags and the hybrid layer of edited streets is provided to each data contributor so they may consider whether to incorporate these changes into their source data. If changes are incorporated by each contributor, the stitching process will be easier in the future.

Standardizing Data Attributes:

Since the street centerline data are all from different sources, we need to develop a standard for the data attributes so that when the edited streets are eventually merged to form a seamless layer, the attributes can also be "seamlessly" joined. **This attribute standard will be articulated elsewhere in the data model.** It will likely contain address related attributes, a linear referencing system (LRS), a unique feature identification scheme and a date.

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ol Required

Custom tools need to be developed in the GIS environment to translate the data contributor's attribute scheme into the framework standard. These tools can be developed in an iterative fashion, with additional translations added as new contributors come on board.

These tools can be reused to duplicate any of the standardization in the future.

Example:

```
#Translator Section for "Contributor A"  
Calculate FROM_ADD_R = FRADD_R  
Calculate FROM_ADD_L = FRADD_L  
Calculate TO_ADD_R = TOADD_R  
Calculate TO_ADD_L = TOADD_L  
Calculate STNAME = NAME
```

```
#Translator Section for "Contributor B"  
Calculate FROM_ADD_R = FADD_RIGHT  
Calculate FROM_ADD_L = FADD_LEFT  
Calculate TO_ADD_R = TADD_RIGHT  
Calculate TO_ADD_L = TADD_LEFT  
Calculate STNAME = STREET_NAME
```

Merging Data:

To merge the data, all streets that are flagged as "Edit" or "Delete" in each contributor's source data are selected and deleted. **Using a basic map-merge function**, these datasets are then merged with the hybrid layer that contains only the edited streets at jurisdiction boundaries. Topology is built and checked for this new layer. Because of the editing and street attribute standardization processes in the previous two steps, the map-merge function should complete successfully. The end result is a seamless, regional street centerline data layer with common attributes for each segment.

Appendix E – WA-Trans Pilot Communication Plan *Draft*

Introduction

The Washington Transportation Framework for GIS (WA-Trans) project is beginning work on pilot projects. Multiple pilots could run concurrently. Because that is likely this document has been developed to provide common processes and direction for communication related activities for all pilot. Those are change management and issue management (dispute resolution). Those processes are also described in this document following the formal communication plan.

The communication plan consists of the following parts:

- Description of Organizational Units
- Communication Flow Diagram
- Description of Planned Communication Deliverables or Events
- Communication Matrix showing who participates, what they are participating in, what their level of involvement is and the method of delivery for the communication as well as how frequent the communication is.
- Change Management Plan
- Change Request Form
- Issue Management Plan
- Issue Form

It is anticipated that there will be adjustments to this plan on a pilot-by-pilot basis, but the structure of the participants' roles and the processes and communication deliverables should be fairly consistent.

Organizational Units

Project Manager - Manager of the statewide WA-Trans effort.*

WA-Trans Steering Committee - Steering committee of the statewide WA-Trans effort.*

Data Modeling Team – Works with Oregon data modeling team to extend the “All Roads” data model for Washington needs.

Pilot Advisory Committee – This committee is formed for the duration of the pilot. It consists of the Project Manager, Pilot Technical Lead, Steering Committee member and Partner Representative(s).**

Pilot Technical Lead – This individual provides leadership over a specific pilot effort and the related pilot implementation.**

Pilot Team – This is the technical team that implements the pilot project.**

Pilot Partners – Representatives from agencies and jurisdictions providing data or testing business needs for the pilot.

WA-Trans Partners – Partners of the statewide WA-Trans effort.*

Framework Management Group – Coordinating group between various Washington State framework data themes. This group reports to the Washington Geographic Information Council (WAGIC).*

Granting Authority – The authority paying for the pilot. The communication with this group will change as funding sources change and will be adjusted for each pilot as needed.**

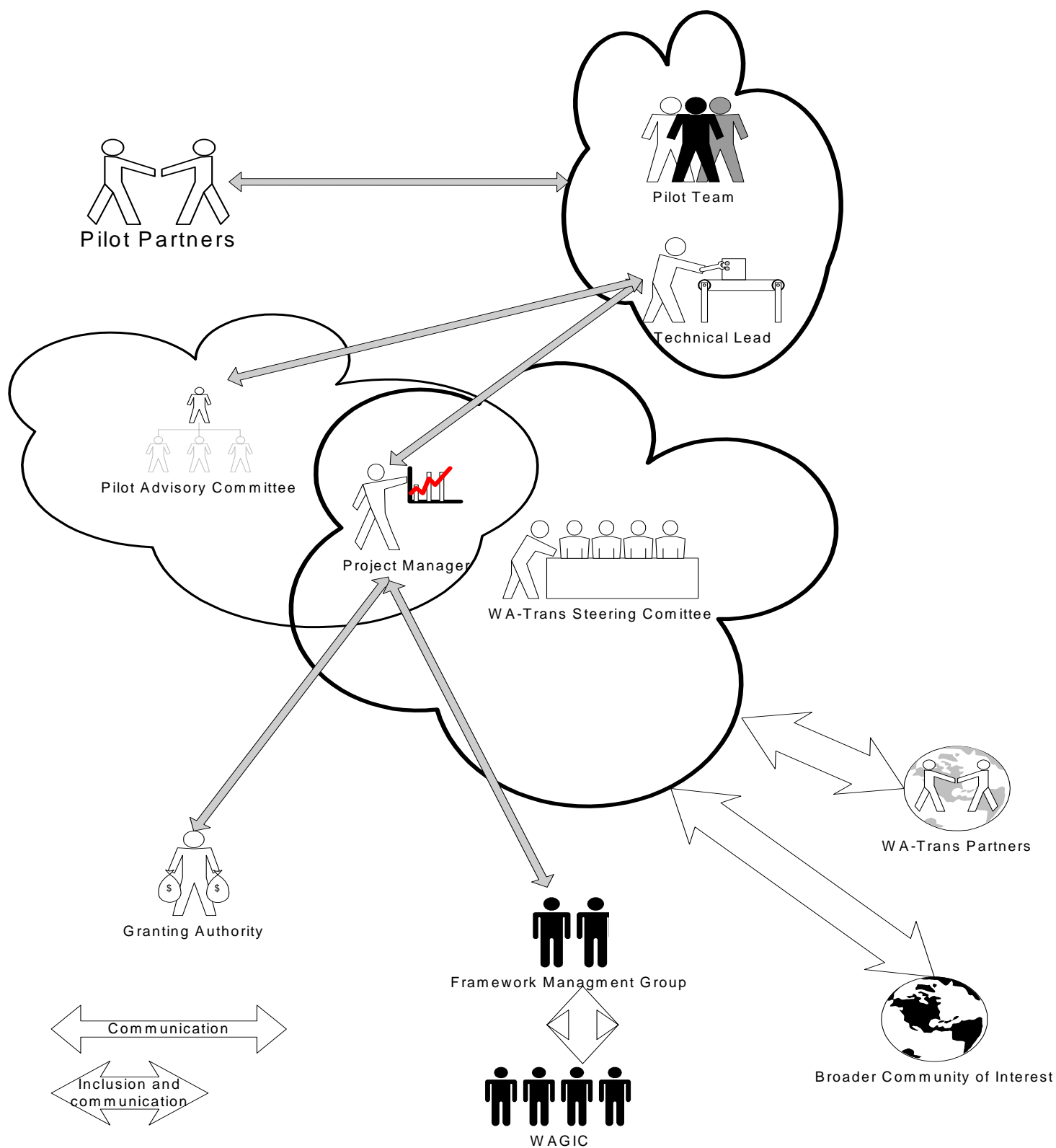
Broader Community – This includes interested parties who may be receiving information about the WA-Trans effort and/or any specific related pilot effort but are not partners.

***NOTE** – The specific description of the roles and responsibilities of this group or individual can be found in the WA-Trans project charter at

<http://www.wsdot.wa.gov/mapsdata/TransFramework/presentations.htm#Documents>.

****NOTE** – The specific description of the roles and responsibilities of this group or individual can be found in the specific charter to be developed for each pilot effort.

WA-Trans Pilot Communication Flow Diagram



Communication Events

Charter –Documents agreement between partners regarding pilot scope, roles and responsibilities, metrics, and business needs to be tested.

Schedule –Includes a work breakdown structure, project schedule, budget and specific resources assignments for a pilot.

Status Report (High Level & Detailed) – Status reports will be given periodically to various levels as described. This includes reports on budget, resources , and status against the schedule, change requests and issues to resolve.

Change Request –Form to document requested changes to the scope of the project. This is described in more detail in the change management section of this document.

Issue Statements – Documentation of an issue which is causing slowing down or stopping pilot progress or which is anticipated to when it becomes critical. This is described in more detail in the issue management section of this document.

QA/QC Plan (High Level & Detailed) –Plan for testing the viability of the data after it has been integrated. Testing will occur at various levels.

Metrics Reports (High Level & Detailed) – Report on how the pilot meets the standards and measurements set for determining success.

Marketing Plan – A communication plan directed at reporting the successes, value and benefit of WA-Trans based on specific pilot results.

Database Review – Review of final database before it is used in a pilot effort.

OIT Change Management – Placeholder if the pilots are implemented at WSDOT.

OIT Database Review – Placeholder if the pilots are implemented at WSDOT.

OIT Implementation Meeting –Placeholder if the pilots are implemented at WSDOT.

Pilot Lessons Learned – Final document describing what worked well, what should be done differently and project management lessons (CBA, schedule feedback, budget feedback).

Partnership Memorandum of Agreement (Pilot) – A formal agreement between partners of a pilot regarding resources and data for the pilot.

Data Sharing Agreement – A formal agreement between data providers and the WA-Trans project regarding long term sharing and maintenance of data.

Licensing Agreement –Placeholder for results of decision on licensing in Steering Committee.

Software Requirements and Scope (High Level & Detailed) – Specific descriptions of software to be developed during a pilot. High level is provided prior to the pilot and detailed are a deliverable of the pilot.

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Software Test Plans (User Test, Unit Test and System Test) – Specific test plans targeting the goal of the tester. User tests are for the possible users of the system. Unit tests are tests performed by technicians of specific segments of software applications. Systems tests are complete end-to-end tests of software and data prior to user testing.

Local Meeting: Pilot Intro – Initial meeting(s) with potential pilot partners to establish and formalize goals, opportunities and barriers.

Local Meetings – Regular meetings to keep local stakeholders informed of progress.

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Communication Matrix

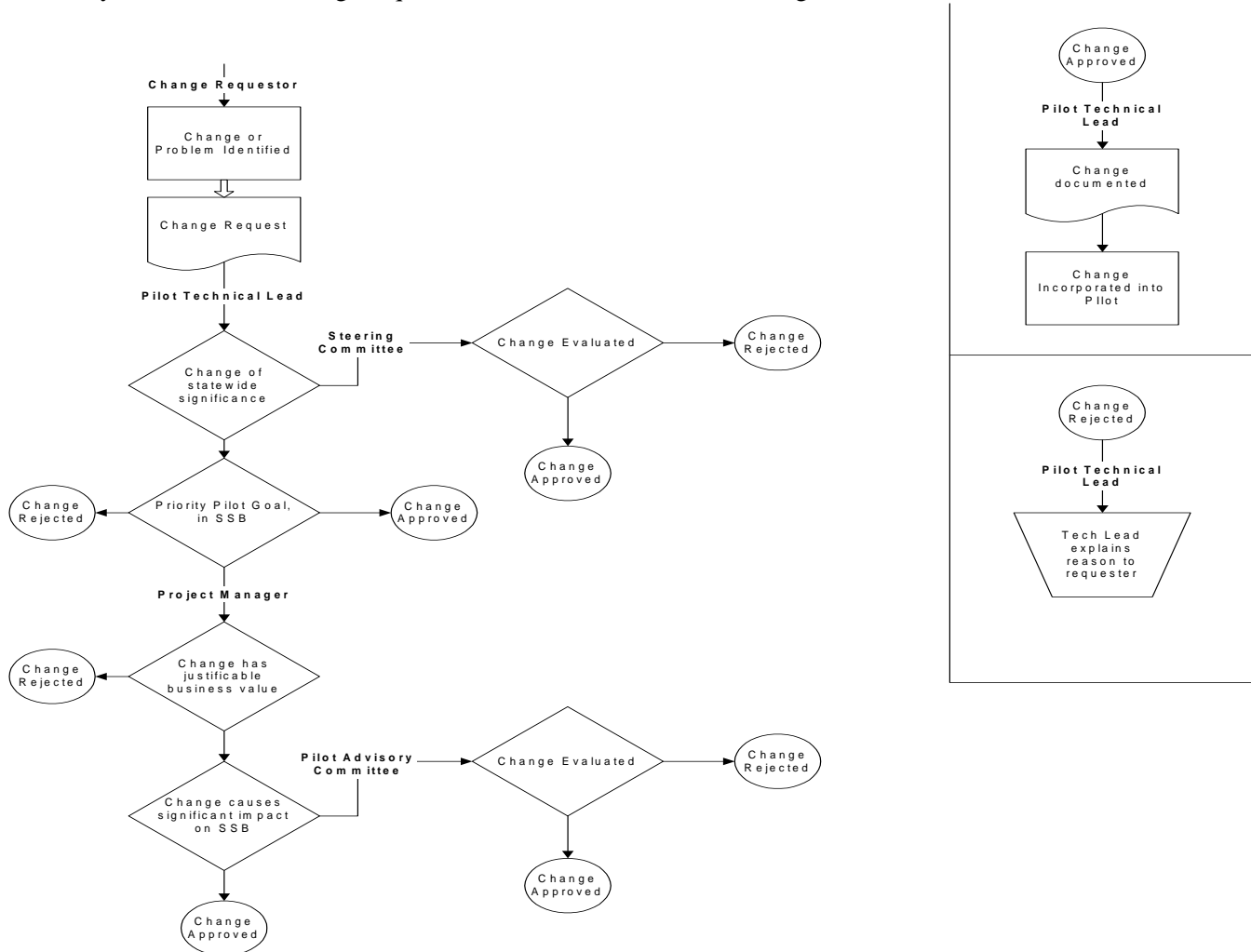
| | Project Manager | WA-Trans Steering Committee | Data Modeling Team | Pilot Advisory Committee | Pilot Technical Lead | Pilot Team | Pilot Partners | WA-Trans Partners | Framework Management Group | Granting Authority | Broader Community | Period |
|-------------------------------|-----------------|-----------------------------|--------------------|--------------------------|----------------------|------------|----------------|-------------------|----------------------------|--------------------|-------------------|---------------------------------|
| Charter | L | R – M | | A – M | S | U | A – M | R – W | R – W | A – M | R – W | Once |
| Schedule | L | R – M | | A – M | S | U | A – M | R – W | R – W | A – M | R – W | Once |
| Status Report (HL) | L | R – M | | | S | | | R – W | R – M | R – M | R – W | At regularly scheduled meetings |
| Status Report (DT) | A – M | | | R – M | L | S | R – M | | | | | Weekly |
| Change Request | | | | | | | | | | | | |
| Issue Statements | | | | | | | | | | | | |
| QA/QC Plan (HL) | L | S/A – M | | R – M | R – M | R – M | R – M | R – W | R – W | R – M | R – W | Once |
| QA/QC Plan (DT) | R – M | | | A – M | L | S | A – M | R – W | | | R – W | Once |
| Metrics Reports (HL) | L | A-M | | | S | | R-M | R-W | R-W | R-M | R-W | Once |
| Metrics Reports (DT) | A-M | | | A-M | L | S | R-M | | | | | Once |
| Marketing Plan | L | R-M | | | S | | | R-W | R-W | | R-W | As needed |
| Database Review | L | R-M | A-M | R-M | R-M | | R-M | R-W | R-W | | | Once |
| OIT Change Mgmt. | | | | | | | | | | | | |
| Pilot Lessons Learned | A-M | R-M | | A-M | L | S | A-M | R-W | R-W | R-M | R-W | Once |
| Partnership MOA | L | R-M | | A-M | S | | A-M | R-W | R-W | | R-W | Once |
| Data Sharing Agreement | L | R-M | | A-M | S | | A-M | R-W | R-W | | R-W | As needed |
| Licensing | | | | | | | | | | | | |

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| | Project Manager | WA-Trans Steering Committee | Data Modeling Team | Pilot Advisory Committee | Pilot Technical Lead | Pilot Team | Pilot Partners | WA-Trans Partners | Framework Management Group | Granting Authority | Broader Community | Period |
|--|------------------------|------------------------------------|---------------------------|---------------------------------|-----------------------------|-------------------|-----------------------|--------------------------|-----------------------------------|---------------------------|--------------------------|--------------------------|
| Agreements | | | | | | | | | | | | |
| Software Requirements & Scope (HL) | L | A-M | | | S | | | R-W | R-W | A-M | R-W | Once |
| Software Requirements & Scope (DT) | A-M | | | A-M | L | S | R-M | | | | | Once |
| Software Test Plans (User Test) | L | A-M | | | S | | | R-W | R-W | R-M | R-W | Once |
| Software Test Plans (Unit & System) | A-M | | | A-M | L | S | A-M | | | | | Once |
| Local Meeting Pilot Intro | L | | | S | S | | S | | | | | Once per location needed |
| Local Meetings | S | | | S | L | S | S | | | | | |
| | | | | | | | | | | | | |

Change Management Plan

Change management (also known as change control) is a process used for management scope, schedule and budget. Changes in pilots will follow the Project Change Management Process. The partners or technical staff may request changes in the pilot scope through the Pilot Technical Lead. The Technical Lead evaluates the change request in terms of whether the request supports a priority pilot objective. If so, the request is evaluated in terms of the cost and impact to the pilot scope, schedule and budget. Based on this the Technical Lead will either reject or accept the change. If the change alters the scope, schedule or budget the change request is sent to the Project Manager. The Project Manager will evaluate the request. If the change on scope schedule or budget is small and the value of the change is significant the Project Manager will approve the change. If the change causes significant impact to the schedule or budget the request will be submitted by the Project Manager and Technical Lead to the Pilot Advisory Committee for resolution. If the change has statewide significance (ex. changes the data structure, changes the priorities or vision set by the steering committee or affects implementation already underway elsewhere, the change request will be submitted to the Steering Committee for resolution.



Change Request Form

Washington Transportation Framework (WA-Trans)

Change Request Form

| |
|-----------------------------------|
| Date: |
| Change Request Number: |

Pilot Name:

| | |
|------------------------|----------------------|
| Requestor Name: | Phone Number: |
| Organization: | |

| Change Request <i>Completed by Requester</i> |
|--|
| Description of requested change: |
| |
| Expected benefits or reason for change: |
| |

| Authorization <i>Completed by Technical Lead or Project Manager</i> |
|--|
| Type of Change: Geographic <input type="checkbox"/> Data Set <input type="checkbox"/> Software <input type="checkbox"/> Database <input type="checkbox"/> |
| Cost of Change: \$ \$0.00 Hours 0 |
| Schedule Impact: |
| Resource Type Needed: |
| |







| Approvals |
|--|
| Change in SSB approved by Tech. Lead – Date Approved: |
| Change justifiable & minimal SSB approved by Proj. Mgr. – Date Approved: |
| Change justifiable & significant SSB approved by Pilot Adv. Com. – Date Approved: |
| Change of statewide significance approved by Steering Com. – Date Approved |

Issue Management Plan

Issue management plans provide each pilot with an escalation procedure for dealing with issues. Issues tend to be technical, organizational, business-oriented or political in nature. Each type of issue requires an escalation process, which facilitates a reasonable resolution at the lowest possible level. This includes expertise and authority to determine solutions and implement resolutions. Issue escalation allows resolution of issues requiring changes in policy and potentially changes of law. Issue management involves identifying the issue, documenting the issue, identifying alternative solutions, and documenting pros and cons of alternative solutions. Issues and issue documentation are then escalated through the appropriate path where they are resolved at the lowest possible level. The documentation is then appended to show resolution. Care must be taken to assure issues are resolved as soon as possible and not left hanging. And issue statement form is provided with the issue management plan to be used for documenting each issue and resolution. Additionally issue documentation provides a history of project decisions made to prevent making the same decision in a different way in different pilots. If this documentation is shared between pilots the learning experience will be shared and thus efficiencies gained.

Assumptions

- Escalating issues for timely resolution is not a poor reflection on anyone's abilities. We would rather have a team come together to resolve an issue or problem quickly, rather than individuals spending an inordinate amount of time trying to resolve it themselves.
- lack of action on unresolved issues is not acceptable. Decisions need to be made in a timely manner.
- If an issue is escalated it becomes a priority task. The time allowed for resolution begins when you are made aware of the issue, it is not begun when you have time to work on it. If your workload is such that you cannot get good for days the team lead needs to decide the priorities. The issue may be assigned to someone else for resolution.
- Prior to escalating an issue it needs to be clearly documented using the Issues Statement Form, to include alternatives and recommendations.

| Escalation Path | Escalation by Issue Type | | |
|---|---|---|--|
| | Technical | Business | Inter-Organizational |
|  | | | Geographic Information Technology Subcommittee of the Information Services Board |
| | | | WAGIC |
|  | | Framework Management Group | Framework Management Group |
|  | | WA-Trans Steering Committee | WA-Trans Steering Committee |
|  | Steering Committee Technical Resources | Pilot Advisory Team | Pilot Advisory Team |
|  | Project Manager | Project Manager | Project Manager |
|  | Pilot Team (i.e., Technical Lead, Programmers, GIS Specialists) | Pilot Team (i.e., Technical Lead, Programmers, GIS Specialists) | Pilot Team (i.e., Technical Lead, Programmers, GIS Specialists) |

Issue Statement

Pilot Name:

Date:

Issue Number:

Prepared by:

Phone Number:

Organization:

Issue Assigned To:

Due Date:

Criticality: High ☐ Medium ☐ Low ☐

Issue Statement

Issue Statement:

Background:

Impact:

Proposed Alternatives

ATTACH ADDITIONAL PAGES AS NECESSARY

ALTERNATIVE 1:

Pros:

Cons:

ALTERNATIVE 2:

Pros:

Cons:

ALTERNATIVE 3:

Pros:

Cons:

DO NOTHING:

Pros:

Cons:

Issue Review/Escalation

Issue Reviewed By:

Date:

Comments:

Issue Disposition

Issue Resolved: Yes ☐
No ☐

Chosen Alternative Number:
If No, indicate disposition of the issue

Comments:

Approval

Issue Mitigation Authorized by:

Date:

Action Items

| WA-Trans Steering Committee Action Items List | | | |
|--|-----------------------------------|--|----------------------------------|
| What | Who | When | Status |
| Write letters supporting WA-Trans and funding of WA-Trans on letterhead of their organizations | All SC Members | ASAP!!! – February 6 would be best! | PSRC, Community Transit complete |
| Speak with Joe and update Access for View and Download | Tami | February 6, 2004 | In Process |
| Update Accuracy in Business Needs Matrix and send to Tami | Dave Wolfer | February 27, 2004 | Assigned |
| Make changes outlined in notes to Security Utilities Draft for WA-Trans | Ian Von Essen | February 27, 2004 | Assigned |
| Meet and discuss how the Translator and Integrator relate and update both documents accordingly | Jerry, Roland | February 6, 2004 | Assigned |
| Make changes to communication plan as defined in the notes. | Tami | February 27, 2004 | Assigned |
| Call Joe Bowles and investigate visiting Walla Walla and Benton Counties in March | Tami | February 13, 2004 | Assigned |
| <i>Update Questionnaire for pilots based on feedback received at the meeting.</i> | <i>Chuck Buzzard/Linda Gerull</i> | <i>January 26, 2003</i> | <i>Assigned</i> |
| <i>Update requirements for the "Universal Translator" based on feedback received.</i> | <i>Jerry Harless</i> | <i>January 26, 2003</i> | <i>Assigned</i> |
| <i>Follow up with WSDOT regarding servers and hosting WA-Trans</i> | <i>Tami</i> | <i>Long term effort</i> | <i>In process</i> |
| <i>Discuss how the Map application Chuck wrote for WA-Trans web application can be used to show project progress and where it should be served from.</i> | <i>Tami and Chuck</i> | <i>ASAP</i> | <i>In Process</i> |
| <i>Meet with the WSDOT assistant Attorney General to discuss this issue and get guidance on what our options are.</i> | <i>Tami</i> | <i>When completed with Tier 2 description and issues</i> | <i>Assigned</i> |

Note: *Italicized items are prior to December 8, 2003 Meeting but are still outstanding unless otherwise stated. Colored items are critical to other things being completed and should be looked at as high priority.*

Date: 8/11/2005

| WA-Trans Steering Committee Action Items List | | | |
|---|-----------------------------------|-------------------------------------|-------------------|
| What | Who | When | Status |
| <i>Refine the High Level Requirements Specifications on Integration for WA-Trans to specify what can be automated and describe that automation.</i> | <i>Roland</i> | <i>Dec. 1, 2003</i> | <i>In Process</i> |
| <i>Develop draft description (high level specs) for software utilities to facilitate QA/QC for WA-Trans</i> | <i>Roland, Chuck, maybe Jerry</i> | <i>February 27, 2004</i> | <i>Assigned</i> |
| <i>Turn WA-Trans into Census to provide us with quarterly extracts of survey data.</i> | <i>Wendy H.</i> | <i>ASAP</i> | <i>On-going</i> |
| <i>Compare various versions of metadata standards (ESRI, WAGI C/ISB, FGDC) and report on differences.</i> | <i>Wendy H.</i> | <i>October 17, 2003</i> | <i>In process</i> |
| <i>Write a proposal for use of DOT pooled research funding for OR/WA pilot with ODOT.</i> | <i>Tami</i> | <i>When an example is received.</i> | <i>In Process</i> |
| <i>Provide results from CRAB survey to WA-Trans.</i> | <i>Dan</i> | <i>When completed</i> | <i>In Process</i> |
| <i>Work with Nick Marquardt, PSRC, and TNM to develop scope of pilot project.</i> | <i>Tami, Jerry</i> | <i>ASAP</i> | <i>In process</i> |

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Date: 8/11/2005

Tami's Status Report Steering Committee Meeting January 26, 2004

Even with the holiday season the WA-Trans Project has continued to move forward:

- I attended a meeting in Salem, Oregon with people from ODOT and the University of Oregon. We spent much of the day strategizing the cross-state pilot proposal and plans. Phase I includes:
 - Prototyping the translator using an iterative development cycle. This involves performing a business analysis to gather requirements specifications and scoping how many of those requirements should be built in the first iteration of the translator. The first iteration is built and tested with one data set to be integrated. The results are used to refine the prototype and then additional requirements are implemented in the prototype. Again it is tested with the original data set and a new data set. This iterative process is continued until all the data is translated and the translator requirements are all implemented successfully.
 - Developing and documenting procedures for non-automated tasks and protocols.
 - Iteratively develop the access for viewing and downloading WA-Trans.
 - Perform a feasibility study and business analysis for integration software to be implemented in Phase II.

Things we are doing to prepare for the proposal include:

- I am working with Bob Grabhorn, a senior software developer in my office who is using our high-level descriptions of software utilities to develop high-level estimates for the software development. These estimates need to be completed by early February so we need to complete the descriptions at this meeting! Thanks go to Ron Cihon for the use of Bob and his time.
 - We need to determine which business needs will be tested in this phase of the pilot ASAP.
 - We need to determine other data sources for Phase I.
- The ODOT data modeler has updated the data model based on input from the various participants. It includes:
 - A method to identify what mode a segment represents,
 - An attribute in the point table to identify a point as a unique "agreement", or "survey" or some other things of interest. Another related table allows storage of basic information about that point.

- An attribute in the segment description table gives the ability to store an LRS from a local road authority if they use one.

I have forwarded the updated model to the steering committee members who are involved in the data modeling effort. I expect feedback by January 29 and then we will schedule another larger joint meeting like the one we had in November to gather approval of the changes.

- And last but not least, I have been granted a resource in my office to assist with writing formal standards for WA-Trans. Shawn Blaesing-Thompson will be taking responsibility for this. When they are done you will have a chance to review them and when we are happy with them they will be presented to the partners for approval. Thanks once again are due to Ron Cihon for Shawn's involvement in this project.

Our next meeting is March 8 from 9 a.m. to 2 p.m. in Spokane at the WSDOT Eastern Region. Video-conferencing will be available.